Western Industry

November 1953

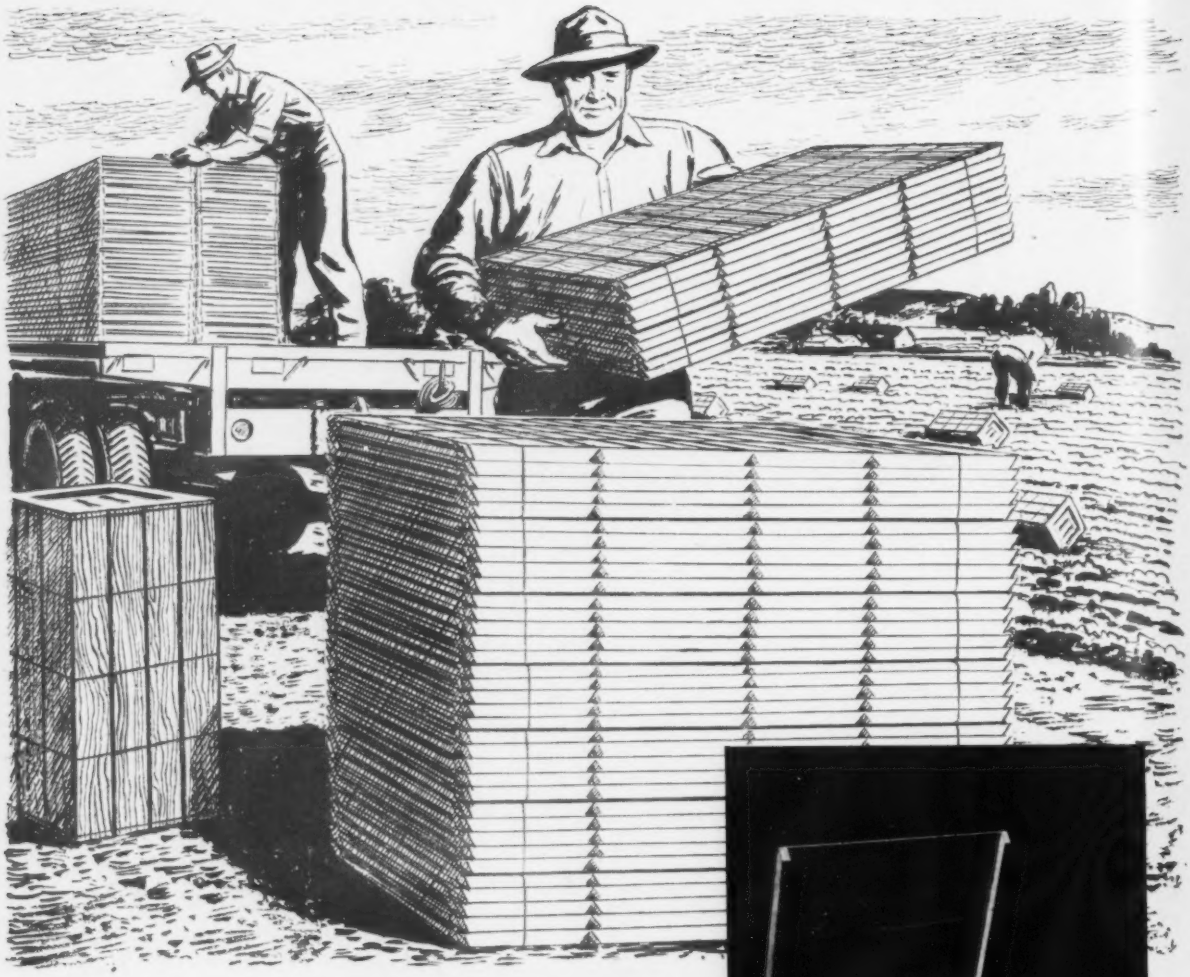
Why go in for the expense of a big cooling tower like this? Because it saves 750,000 gallons of water a day, a tidy bit of economy, particularly in the West . . . see page 26

CALLING THE SIGNALS

Your quality control q.b. . . . p. 29

Where salesmen are welcome . . . p. 32

Plastic pipe . . . p. 43



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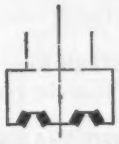
3 internal cone seating surfaces

instead of one external cone which is easily damaged . . .

internal conical seat surfaces do it . . .

external cone — easily damaged



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you won't need to throw away so many cutting tips

Made by National SINCE 1910 WELDING EQUIPMENT CO., San Francisco 5, California

532

Western Industry

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11-43
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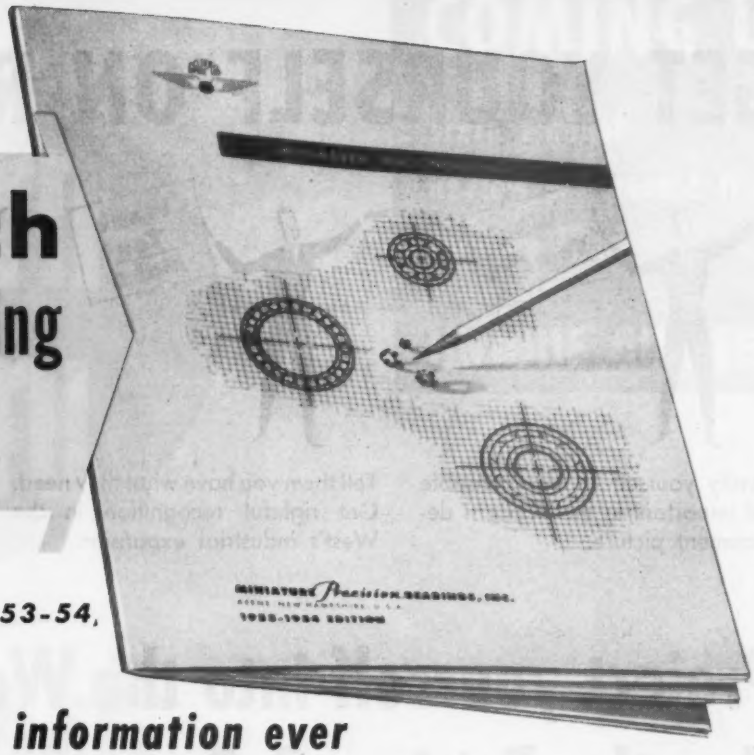

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Review & Forecast Number
January 1954

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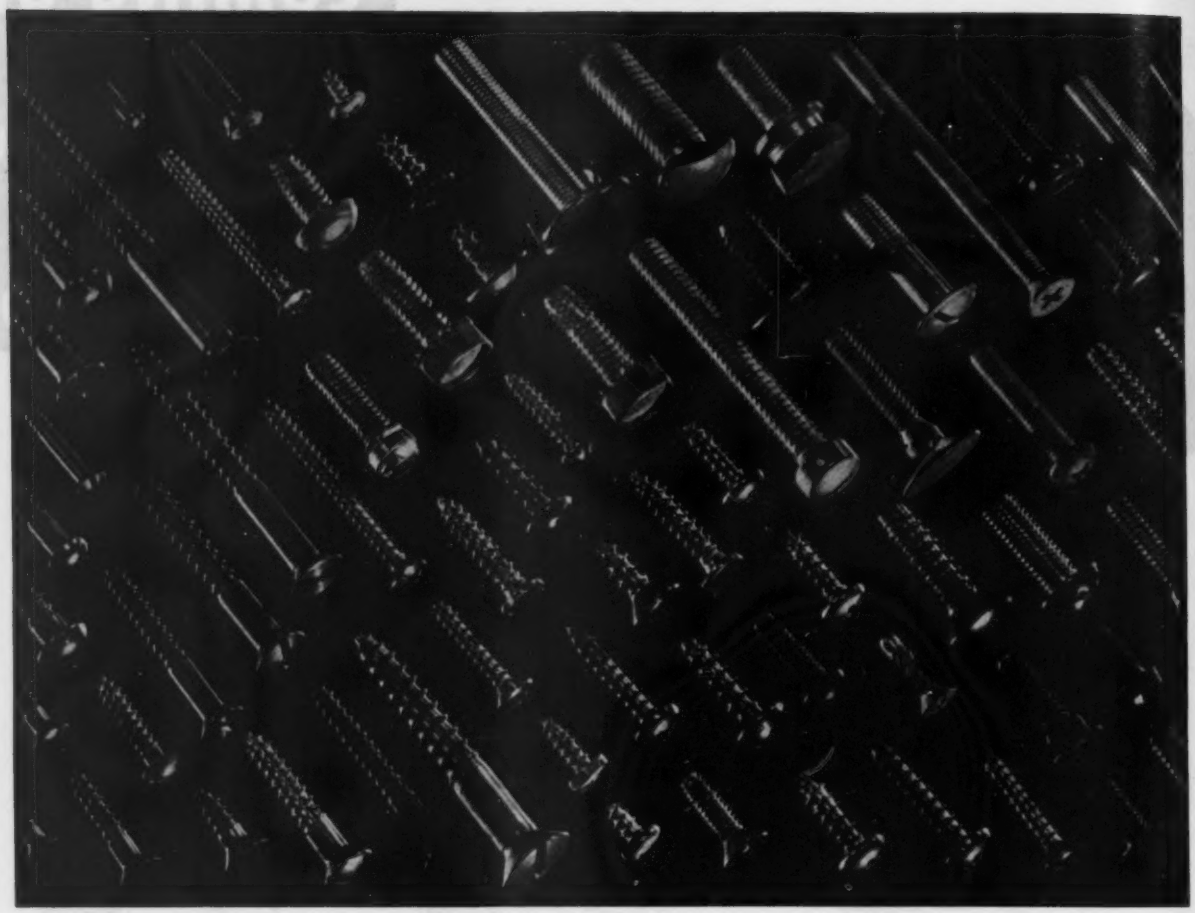

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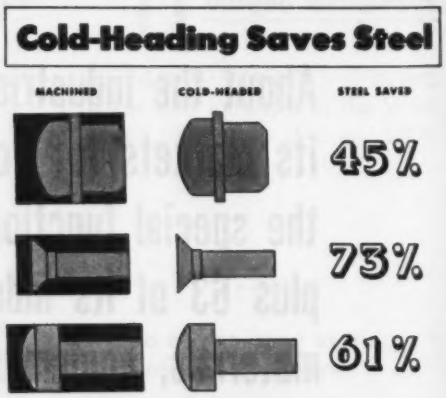

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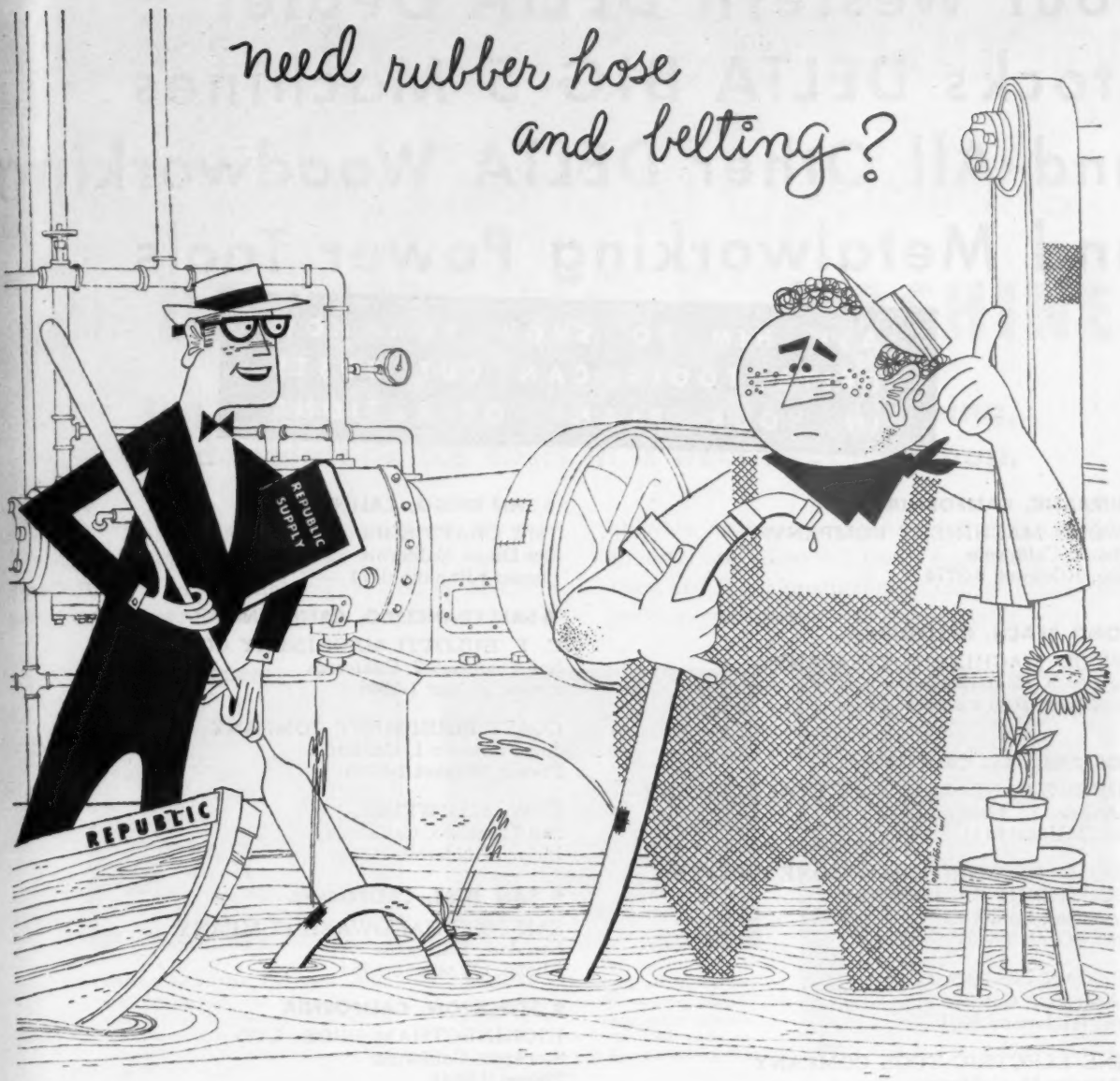

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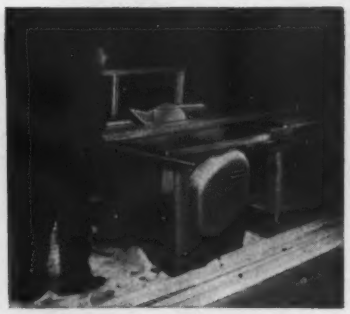

CIRCULAR SAW—Mass production ripping is simple on this massive, big-capacity Delta 12" tilting arbor saw. Its accuracy is built-in for long years of trouble-free service. *Also available in 8" and 10" models.*

PLANER—Delta's 13" x 5" planer is rugged, safe, amply powered, and does a precision job on any stock from 13" x 5" boards to 6" pieces unbutted. No kick-back is possible. *Also available in 24" x 8" model.*

BAND SAW—Ideal for curve cutting and scroll work, the Delta 20" band saw is fast, safe, and cuts one piece or many stacked pieces . . . with absolute accuracy. *Also available in 14" and 36" models.*

JOINTER—The long work table on the Delta 8" jointer makes it an ideal tool for easy handling of long boards. Making true "finish" cuts fast eliminates extra operations. *Also available in 6" model.*

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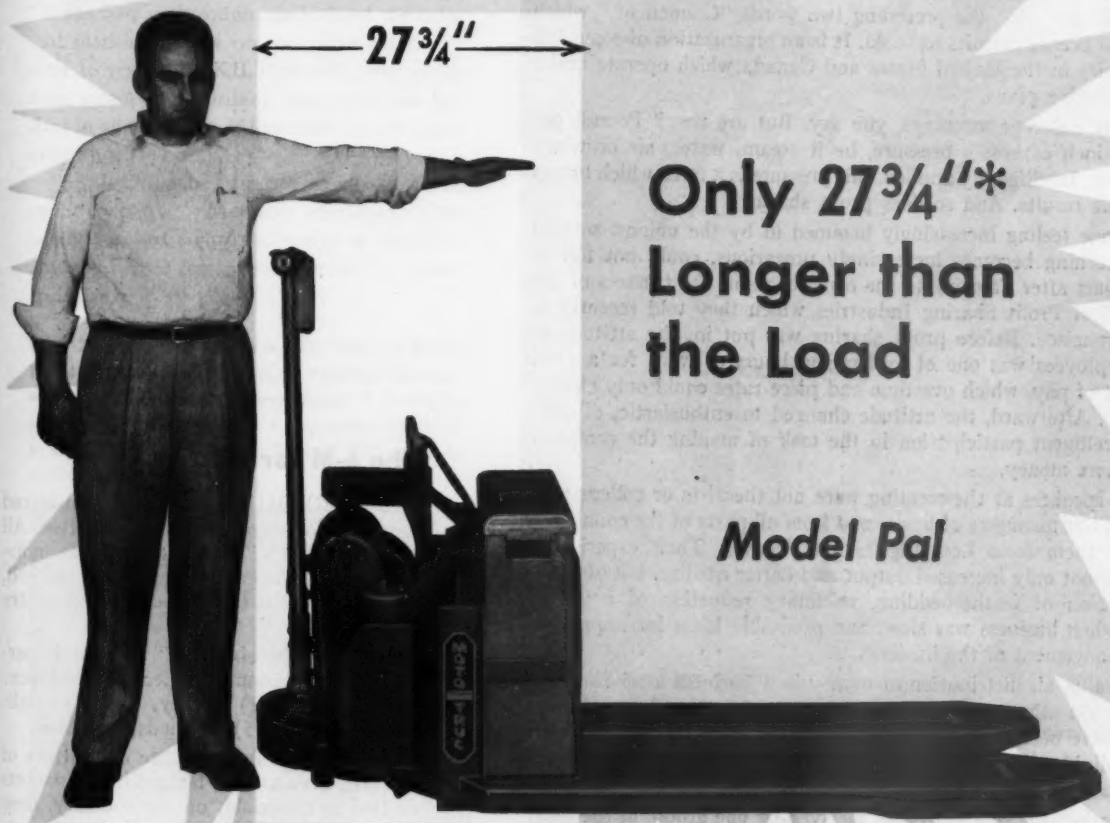

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LARGEST EXCLUSIVE MANUFACTURER OF "WALKIES"

MOTO-TRUC — Designers FOR THE INDUSTRY — PATENTED

Western Industry

EDITORIALS

PSI and PSI

THE FIRST "PSI", as everyone knows, is pounds per square inch. The second, not so well known, stands for "Profit Sharing Industries," if you omit the preceding two words "Council of," which editorial license permits us to do. It is an organization of some 750 companies in the United States and Canada which operate under profit sharing plans.

Vastly different meanings, you say. But are they? Pounds per square inch expresses pressure, be it steam, water, air or what-have-you. Intelligently applied, this pressure is a force which brings desirable results. And so does profit sharing.

Anyone feeling increasingly hemmed in by the unions, so that profit-earning becomes increasingly precarious, could not fail to take heart after listening to the experiences of the trustees of the Council of Profit Sharing Industries which they told recently in San Francisco. Before profit sharing was put in, the attitude of the employees was one of exchanging hours of work for a fixed amount of pay, which overtime and piece rates could only change slightly. Afterward, the attitude changed to enthusiastic, diligent and intelligent participation in the task of making the company earn more money.

The speakers at the meeting were not theorists or college professors, but managers of businesses from all parts of the country—two of them from Los Angeles and Denver. Their experiences covered not only increased output and better quality, but also the elimination of featherbedding, voluntary reduction of hours of work when business was slow, and profitable ideas for improving the management of the business.

Actually, all distribution of money in a business after raw materials and other supplies, rent, taxes and all the other overhead items have been paid for, is profit sharing. Whatever the channel, be it dividends, whether cash or stocks, bonuses, commissions, salaries or wages, it is still profit sharing.

But when the share of profit received by one group, in the form of wages, becomes a fixed amount which can only be increased by bargaining, then the PSI, or pounds per square inch of effort, will only be exerted to exact more money from management. The members of the Council of Profit Sharing Industries have found that the PSI in their title betokens a pressure that the employees cheerfully exert to make the business more profitable, both for themselves and for management. Does this kind of PSI appeal to you?

Unions work at it. Does management?

"THE STEELWORKERS UNION has an annual training institute at the University of Utah, where grievance procedures and other matters are studied," reports the Industrial Relations Council of Utah. "The union furnishes handbooks telling the men how to spot a grievance. Union men carry contracts on the job and often know more about contract provisions than their foremen."

The 6-M formula

A 6-M FORMULA is usually considered requisite for any industrial enterprise. All six of the "M's" are believed to be indispensable. If the enterprise fails to succeed, it is supposedly because one or more are missing.

Here are the six "M's" in what is perhaps the most common order of importance: (1) Markets, (2) Money, (3) Materials, (4) Machines, (5) Methods, (6) Men.

Actually the first five are derivatives of the last. Men are not hedged in by markets or tied to materials; on the contrary, they discover them. Men are not limited to machines; a patent is only a challenge to man's ingenuity to find a better way of achieving the objective. Methods are only the channels grooved out by trial and error, or by the projection of experience; men find new methods as they feel free to discard the old. Money is merely inspired confidence.

But for men there are no substitutes. So, in the last analysis, we need only a 1-M formula. If the 1-M is sound and active, the other five follow of themselves.

"We've given this SKIL Drill 16 years' hard use with only one servicing!"

says **Ludwig Meyerott,** foreman,
Century Manufacturing Co.,
Pittsburgh, Pa.,

makers of custom counters and sink tops
for commercial and home use.

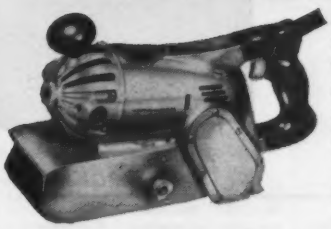
"We use this drill on every type of material and we use it every day," says foreman Meyerott. "It has had such rough use little of the original markings show on the name plate, but after 16 years this SKIL Drill still gives us the best, clean, sharp drilling you could ask for. And in all that time, it has been out for repair only once!

"SKIL Drills are easier to handle—even in cramped places," Meyerott continues. "The balance is just right, the design is compact. And you need less pressure with the power and easy grip."

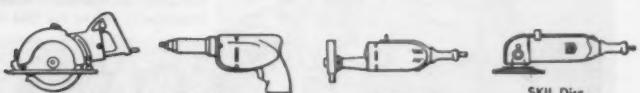
With 26 Models, There's a SKIL Drill for Every Need! Helical Gears • Die-Cast Aluminum Housings • Oversize Brushes • Reserve Power • Statically and Dynamically Balanced • Capacities: ¼" to 1" in steel; 2" in hardwood • Speeds: 200 r.p.m. to 5,000 r.p.m.

Foreman Meyerott Sands Aluminum With the Model 448 SKIL Belt Sander. "This tool sands plywood, solder, aluminum—any material that comes along," he states. "And we always get a fast, smooth, flush job. For large areas or close work we find SKIL Belt Sanders best.

"We *need* tools that can be adapted to any material or job, so a man can go from one operation to another without changing tools. Because they 'fill the bill' so well we use only SKIL Belt Sanders."



SKIL Belt Sanders for Fast Finishing at Lowest Cost. Finest tools made for rough or fine sanding of almost any material. Belt widths from 2¼" to 4½" assure right tool for *your* needs. Lightweight, perfectly balanced with powerful trouble-free motors for production use. Five models to meet every sanding need; with or without vacuum attachment.



SKIL Saw | SKIL Driver | SKIL Grinder | SKIL Disc Sander

Made only by SKIL Corporation
formerly SKILSAW, Inc.
5033 Elston Avenue, Chicago 30, Illinois
3601 Dundas Street West, Toronto 9, Ontario
Factory Branches in All Leading Cities

SKIL
PORTABLE TOOLS

FOR COMPLETE INFORMATION, CONTACT YOUR SKIL DISTRIBUTOR OR CALL YOUR NEARBY SKIL FACTORY BRANCH

Big Savings

2-ton bundles of 18-foot steel panels are quickly loaded into railroad cars with the Tramrail crane which operates over loading dock and railroad tracks.

5-ton loads of sheet steel are picked up from trucks with the motor-operated grab controlled by the cab operator. Trucks that formerly required 3 to 3½ hours to unload are now usually gone in 20 minutes.

In only five minutes waiting time this truck is loaded with lumber and ready to go. Up to 5,000 ft. weighing 10,000 lbs. are expedited in this manner. Two hours truck time is saved with the electric Tramrail hoist carrier on every load.

A simple wall-type jib transfer crane enables transporting one-ton loads of scrap by magnet from building to gondola car or to storage bins on other side of track. It is swung back and locked to building when a locomotive passes through. Sheet steel and other steel items can also be handled by Tramrail magnet carriers.

GET THIS BOOK!

BOOKLET No. 2008. Packed with valuable information. Profusely illustrated. Write for free copy.

CLEVELAND TRAMRAIL

OVERHEAD MATERIALS HANDLING EQUIPMENT

CAN BE MADE ON *LOADING!*

HERE ARE *10 WAYS* THAT
CLEVELAND TRAMRAIL SYSTEMS
Pay off in the Loading of Cars and Trucks

Cleveland Tramrail equipment engineered to suit your truck or railroad loading and unloading most likely will provide you with one or several of the following advantages:

1. Permit handling larger units at a time, i. e., greater weights, more pieces.
2. Enable moving them in a fraction of the time required by ordinary hand methods.
3. Drastically reduce hours required for loading or unloading.
4. Provide direct delivery to or from warehouse or point of work without time-consuming reloading to other conveyances.
5. Reduce or eliminate railroad car demurrage.
6. Minimize idle loading time of trucks and increase effective hauling time—thus, more can be hauled with a truck per day.
7. Often save need of purchasing additional trucks because of more effective use of present ones.
8. Expedite deliveries to customers and thereby gain good will.
9. Cut purchase price of some materials by buying them packed in larger units.
10. Improve safety by eliminating accidents caused from heavy, manual handling and lifting.

Experience ...

with a great many Cleveland Tramrail car and truck loading installations has proven that they pay big dividends. Check *your facilities* and ascertain how many of the above advantages you could secure with properly engineered overhead Tramrail equipment . . . and discuss it with a Cleveland Tramrail representative.

3-ton packages of steel are picked up with the hand-operated grab and delivered to various points in the building on the overhead track system.

Steel sheets are unloaded easily with this 3-ton swinging transfer jib crane which permits carrier with load to be run onto track system inside building and delivered direct to storage. When not in use the jib crane is swung against wall, out of the way.

CLEVELAND TRAMRAIL DIVISION
THE CLEVELAND CRANE & ENGINEERING CO
8875 East 284th St. Wickliffe, Ohio

LETTERS

Contributions to this column from our readers are welcome. Names will be withheld from publication if so requested. Unsigned letters, however, will be disregarded.

"What the West Needs Most"

Editor, *Western Industry:*

I thoroughly enjoyed your 1953 Review and Forecast Number, and studied its contents with much pleasure. I was particularly impressed with your editorial "What the West Needs Most." Since I found myself in complete agreement with your comments, I also see the need for dynamic efforts which can develop many practical benefits for Western industry. The vastness of the West is a rather flimsy obstacle. In the past, when geographic situations have posed a problem, many workable techniques have been employed for the benefit of all. Should the Western States Council or other agency wish to embark on a project for meeting the "communication need," I should be delighted to pass on a suggestion or two.

With sincere good wishes for a most successful annual issue and the fine job you are doing,

DANIEL RASHALL
Public Relations Consultant, Western Lighting Manufacturers Institute
Los Angeles

[*The editorial referred to stressed the fact that the big need of the West is means of communication of ideas and information about the West, particularly the less understood factors which affect the West's industrial growth.*]

* * *

Still good, six years later

Editor, *Western Industry:*

I have a request for a photocopy of:

Western Industry, January 1947, Western Sugar Plants Pioneer in New Ion Exchange Process

and I wonder if you can help me. I should be most grateful to receive, together with your invoice, the required photocopy or a copy of the appropriate issue of the publication itself.

With many thanks for any help you can give.

MRS. M. E. MACKIEWICZ
Information Officer, Association of Special Libraries and Information Bureaux
London, England

[*The article requested in the above letter, which summed up the ion exchange developments in the sugar industry, attracted considerable attention at the time, and* Western Industry *received orders from several sources for reprints, totaling 10,000 copies.*]

* * *

Who can answer this?

Editor, *Western Industry:*

Recently our company began manufacturing aluminum windows. One of the most frequent questions asked our salesmen by customers concerns the comparative maintenance costs of aluminum versus steel windows. This department has been able to locate very little information along these lines. Has anyone made a comparison of this kind?

Any assistance you could give us would be greatly appreciated.

CHARLOTTE M. JACQUES
Commercial Research Assistant, Soulé Steel Company, San Francisco

More letters on page 22

GEAR PRODUCTS *designed for flight*

Improved engineering today calls for many unusual types of gear products . . . each must be precision made to meet exact specifications. Such gear products are an important part of ADVANCE Gear's production. Our engineers are continually called upon to work hand in hand with engineers of industry in the development of many types of gear products. ADVANCE Gear's facilitier are designed to meet the most difficult gear problems. Whether your requirements call for gears, gear products, or gear assemblies, we invite your consideration of our facilities and experience.

Advance Gear & Machine Corp.
5851 Holmes Ave. • Los Angeles 1, Calif.

Write, phone or wire for complete information

New RPM 10-30 Special Motor Oil can save up to ¾ gallon of gasoline in every 5 gallons you buy

Now...a motor oil so superior it can save up to ¾ gallon of gas in every 5 ...a heavy-duty motor oil so far ahead that just one grade serves all cars and light trucks, all year 'round, in all climates. Proved in the toughest stop-and-go driving, easier-starting "RPM" 10-30 Special saves you money, saves engine wear, boosts performance. Start saving today with RPM 10-30 Special Motor Oil.

CAN BOOST GAS MILEAGE UP TO 15%—more miles per gallon in tough stop-and-go driving.

DESIGNED FOR OLDER CARS AS WELL AS NEW—covers all car manufacturers' motor oil recommendations.

LESS OIL CONSUMPTION—savings as high as 33% compared to light grade oils.

TOPS FOR HYDRAULIC VALVE LUBRICATION—cuts noise and sticking.

STEPPED-UP POWER—for better acceleration, more pull on hills.

EASIER STARTING—battery-saving starts in all weather.

MONEY-SAVING MOTOR PROTECTION—tops for preventing wear of critical engine parts.

ONE OIL FOR ALL PURPOSES—covers SAE grades 10W, 20W, 30; recommended for all seasons, all climates.

10-30 SPECIAL RPM MOTOR OIL

Certified

This is to certify that we have made our own investigation of RPM 10-30 Special Motor Oil. Our findings confirm the above claims regarding the qualities of "RPM" 10-30 Special.

THE TWINING LABORATORIES

By Fred W Twining

STANDARD OIL COMPANY OF CALIFORNIA

SAVE ... With the Belting That's Built to Give Extra Service!

"Belting at its best" . . . that's Goodall belting . . . product of modern manufacturing methods, skilled craftsmen and over 80 years of experience. Built to assure important savings thru longer service life with maximum freedom from shutdown time for maintenance and repairs.

GOODALL *Bulk* CONVEYOR BELTING

Selected by the construction industry for the really *big* jobs like Detroit and Chief Joseph dams. Preferred by operating men in general industry, who know that rubber belting built the Goodall way costs *less* in the long run. "Super Triple-S," "Triple-S" and "Goodall" brands are Industry's "Standard of Quality."

GOODALL *Package* CONVEYOR BELTING

For handling packages of any kind or size, efficiently, economically . . . on the level or up-hill. "HI-CLIMBER" Incline Belting has a tough, molded "Tentacle-Grip" surface that eliminates sliding and slippage on inclines up to 35°.

NEW *Built-in* RUBBER CLEATS

GOODALL "Sky-Kleet" Rubber Cleats . . . for portable or fixed incline conveyors. Not merely attached, but incorporated as part of the actual belt construction. No tearing loose or pulling away . . . no damage to delicate products. Can be ordered built-in on any grade of Goodall belting.

Contact Our Nearest Branch for Details

GOODALL RUBBER COMPANY

Est. 1870

GENERAL OFFICES, MILLS and EXPORT DIVISION, TRENTON, N. J.

Branches: Philadelphia • New York • Boston • Pittsburgh • Indianapolis • Chicago • Detroit • St. Paul • Los Angeles • San Francisco • Seattle • Spokane • Portland • Salt Lake City • Denver • Houston • Goodall Rubber Company of Canada, Ltd., Toronto • Distributors in Other Principal Cities

LETTERS

Continued from page 20

Stockton's potential

Editor, *Western Industry:*

We wish to commend you on the completeness of your article on bulk loading facilities on the West Coast, and also particularly for the boost which you gave the Port of Stockton as having the greatest potential for a bulk handling facility. We are making every effort to increase the efficiency of the plant, with the view toward reducing the bulk handling rate.

DAVID J. BENDER
Manager, Bulk Materials Dept.,
Port of Stockton, Calif.

* * *

Coal people pleased

Editor, *Western Industry:*

We read the article on bulk loading facilities in your August issue and found this most interesting and instructive. The writer of this article obviously spent considerable time preparing his data, and the result is, in our opinion, very commendable.

P. L. SHIELDS
President, Spring Canyon Coal
Company, Salt Lake City

* * *

Long-lived demand

Editor, *Western Industry:*

I am very anxious to obtain the series of articles titled "The Learning Curve" by Glen E. Ghormley, which appeared in *Western Industry* last fall. The second article of the series was published in the October 1952 issue.

If you have reprints, would you send me two C.O.D. If you do not have reprints, could you furnish back numbers of those issues?

S. BRADLEY PARKS
Glendale 1, Calif.

* * *

Useful information

Editor, *Western Industry:*

Two articles in the August 1953 issue seem to offer information very useful to us in solution of plant problems. Will you please mail me a reprint of each:

"Electric Trucks Cheaper in Warehouse Tests," page 53, and

"Choice and Maintenance of Rubber Conveyor Belting," pages 94-100, by Wm. G. Peterson.

R. K. ADAMS
Metallurgical Department, Aulminum
Co. of America, Vancouver, Wash.

Acme Steel Strapping Insures S.A. *(Safe Arrival)*

Saves time and trouble palletizing automobile bumpers

BUMPER-TO-BUMPER. Each multi-bumper unit is securely bound with Acme Steel Strapping, all ready to be moved by fork lift truck.

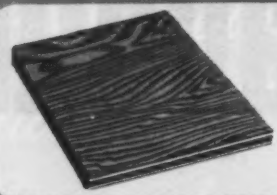
Shipping hundreds of awkward-to-pack, hard-to-handle automobile bumpers to auto assembly plants presents no problem to United States Spring & Bumper Co., Los Angeles. They quickly fasten each pallet-load of bumpers together securely with Acme Steel Strapping, making large easily-handled units.

This makes individual wrapping and loading unnecessary. And it takes only a matter of minutes to strap these bumpers onto pallets. Acme Steel Strapping saves time, money and weight, protects each pallet-load from damage and insures S. A. (Safe Arrival).

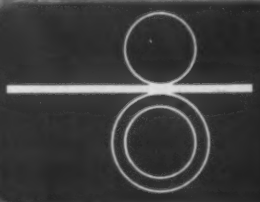
Whatever packaging problems you may have in your plant, chances are that Acme Steel Strapping or Acme Steel Stitching can solve them. Ask your Acme Steel representative. Or write to Acme Steel Products Division, Dept. WI113, Acme Steel Company, 4901 Pacific Blvd., Los Angeles 58, California.

ACME STEEL

STRAP IT . . . STITCH IT . . . SHIP IT . . . SAFELY!



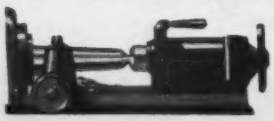
Maas TSP helps make
better adhesives for
the plywood industry.



Maas TSP makes better
degreasing baths
for cold rolling of steel.

Maas TSP preserves fruit
better prior to cooking at
the country's leading packers.

Maas TSP makes
cutting oil emulsions better.



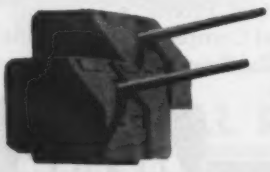
Maas TSP

THE VERSATILE PHOSPHATE

Has many uses in addition to its detergent
and soap applications. Know more
about Maas. Write for our folder.

A. R. MAAS CHEMICAL CO.
Division Victor Chemical Works
4570 ARDINE STREET
SOUTH GATE, CALIFORNIA

Maas TSP gives
cold rubber manufacturers
better viscosity control.



Maas TSP gives
better performance
to gun recoil fluids.

CALENDAR OF MEETINGS

DEC. 2-4—*Mid-Century Conference on Resources for the Future*, Salt Lake City. Sponsored by Resources for the Future, Inc., a unit of Ford Foundation.

DEC. 4-5—*Northwest Mining Assn.*, annual convention, Davenport Hotel, Spokane, Wash. Contact T. Dan Mortimer, assistant secretary, 522 W. First Ave., Spokane.

DEC. 14-15—*Northwest Frozen Food Assn.*, Hotel Olympic, Seattle. Contact Edgar A. Burns, secretary, Title & Trust Bldg., Portland, Ore.

DEC. 31-JAN. 3, 1954—*California & Nevada Manufacturers of Carbonated Beverages*, regional meeting, San Francisco. Contact George Culley, exec. secy., 20 S. First St., Alhambra, Calif.

1954

JAN. 7-8—*Canners League of California*, annual fruit and vegetable sample cutting, Hotel Fairmont, San Francisco. Contact Canners League, 64 Pine St., San Francisco 11.

JAN. 28-30—*Colorado Mining Assn.*, annual meeting, Shirley Savoy Hotel, Denver. Contact Robert S. Palmer, executive vice president, 204 State Office Bldg., Denver.

FEB. 2-5—*American Society of Sugar Beet Technologists*, eighth general meeting, Shirley Savoy Hotel, Denver. Contact Box 531, Fort Collins, Colo.

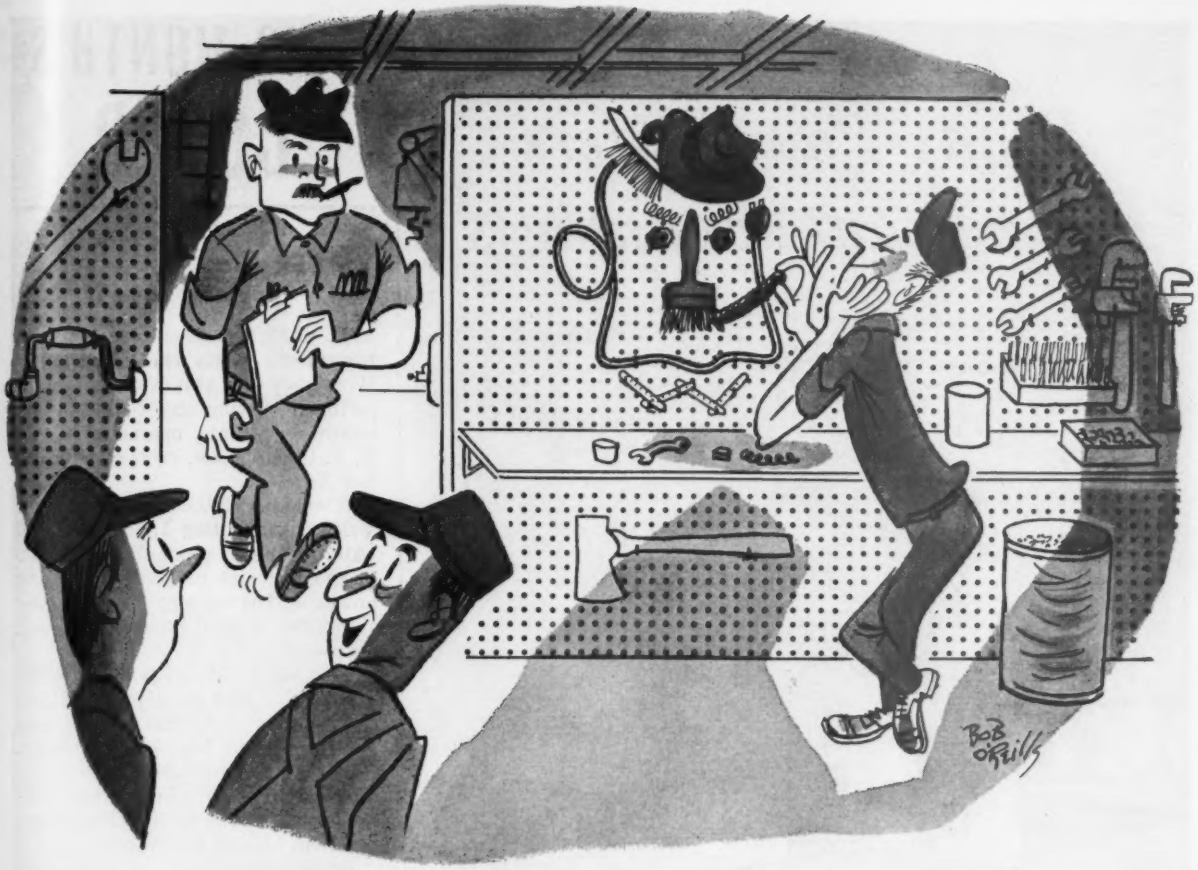
FEB. 15-17—*National Welding Supply Association*, national convention, San Francisco. Contact Robert C. Fernley, secretary-treasurer, 1900 Arch St., Philadelphia 3, Pa.

FEB. 17-19—*Western States Meat Packers Association*, regional meeting, San Francisco. Contact E. F. Forbes, president and general mgr., 604 Mission St., San Francisco.

FEB. 23-28—*American Concrete Pipe Association*, national convention, San Francisco. Contact Howard Peckworth, managing director, 228 N. LaSalle St., Chicago 1, Ill.

MAR. 9-12—*American Management Association*, general management meeting, Fairmont Hotel, San Francisco. Contact Joseph M. Trickett, convention manager, 830 Palo Alto Ave., Palo Alto, Calif.

APRIL 23-24—*Liquid Gas Dealers Association (of Calif.)*, state meeting in San Francisco. Contact Jack A. Douglas, Rt. 2, Box 200, Woodland, Calif.



"I always said you could hang anything on Masonite Peg-Board!"

Anything from a slip of paper to a riveting hammer.

It's easy to hang all kinds of tools, equipment and supplies on walls and partitions made of tough, sturdy Masonite Peg-Board* panels. ⅛" thickness for normal use; ¼" for heavy-duty work.

Thousands of clean-cut holes, one inch apart, allow almost endless arrangements—and re-arrangements as needs change. Metal fixtures—more than 60 different varieties lock on without nails or screws. A twist of the wrist removes them.

See the building materials dealer in your area for the panels and the exact fixtures you need. Made of all-wood hardboard, they're part of the versatile family of Masonite Presdwood® Products—now helping plant men in thousands of ways. Send the coupon for the complete story.

all through the plant...

MASONITE PRESDWOOD

solves maintenance problems!

WESTERN HARDBOARDS FOR WESTERN INDUSTRY

*"Peg-Board" Reg. T.M. U.S. Pat. Off. B.B. Butler Mfg. Co., Inc.

MASONITE® CORPORATION
DEPT. WI-11, 111 Sutter Street
San Francisco 4, California

Please send me your folder on Masonite Peg-Board Panels and your brochure on "How to Improve Factory Methods with Masonite Presdwood."

Name.....

Firm.....

Street.....

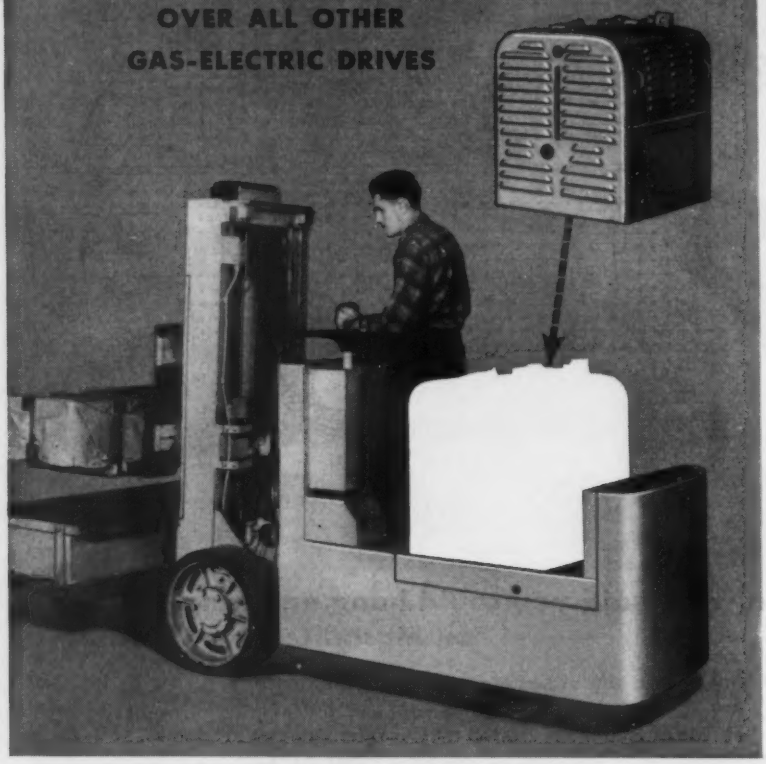
City.....*Zone*.....

County.....*State*.....

"Masonite" signifies that Masonite Corporation is the source of the product

Ready-Power offers 4 important advantages

OVER ALL OTHER GAS-ELECTRIC DRIVES



1—ONLY READY-POWER CAN BE QUICKLY CHANGED. A spare can be installed in 5 minutes!

2—ONLY READY-POWER CAN BE SHIFTED FROM ONE TRUCK TO ANOTHER, permitting standardization of power.

3—ONLY WITH READY-POWER CAN YOUR TRUCKS BE KEPT WORKING with a quick change of power units.

4—ONLY READY-POWER OPERATES AT THE LOW ENGINE SPEED that results in long life and low maintenance.

Remember . . . your truck is no better than its power. It PAYS to convert present electric trucks to Ready-Power . . . and it PAYS to specify Ready-Power when buying new trucks.

CONTINUOUS-DUTY POWER UNITS

The READY-POWER Co.

3814 Grand River Ave., Detroit 8, Michigan

West Coast Representatives:
KARL MOELLENDICK
7813 California Ave.
Huntington Park, Calif.

(Delivery made from stock)
GEORGE HUNDSDORFER
1424—11th Avenue
Seattle, Wash.

THIS MONTH'S COVER

WATER— you can save it

THE VALUE of water conservation is being more widely recognized in the West every day, as is evidenced by the pictures showing the cooling tower recently put into operation at the B. F. Goodrich Co. rubber factory in Los Angeles.

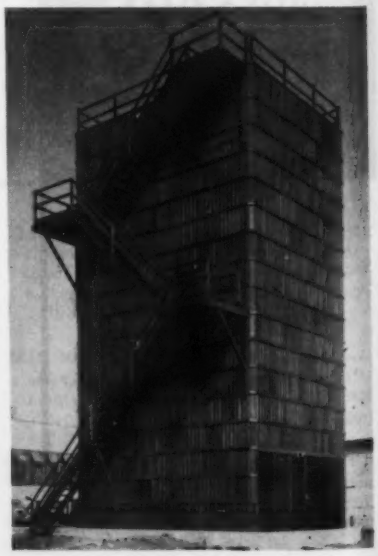
It will save 750,000 gallons of water a day, recirculating 1,000 gallons of water a minute, which has been used in the tire and tube manufacturing processes. The water reaches the tower at 120 deg. F., and emerges at 76 deg. for re-use.

Previous to installation, all water used in the plant came from wells on the property and, after service, was discharged into Los Angeles sewers.

The induced draft cooling tower was designed, completely fabricated of redwood and erected by The Fluor Corporation, Ltd., of Los Angeles.

Importance to the West of the cooling tower method of conserving water is evidenced by the fact that the Cooling Tower Institute, an organization of the leading manufacturers, is located in Palo Alto, California.

INSPECTING this cooling tower in the front cover picture are Frank E. Harper, Goodrich production superintendent at Los Angeles, James F. Sweatt, plant manager, and J. Earl Gulick, vice president of manufacturing, Akron, Ohio.



What's wrong with it this time?

"It" is a valve that was supposed to cut costs. That it did, but first cost only. Beyond, it gave no assurance of quality or dependability. Result: The price tag saving was wiped out many times over by repeated maintenance at today's high labor rates.

That's an important matter with thrifty buyers of piping equipment. They want greater assurance of quality—not fictitious savings. They know it's the only way for a plant to stay within maintenance and operating budgets.

That's why thrifty buyers are insisting on the traditionally better quality of Crane valves and fittings—quality that means longer life and greater freedom from repairs. What's more, Crane puts such quality into piping equipment for every industry's needs.

Crane Co., *General Offices:* 836 S. Michigan Ave., Chicago 5, Ill.
Branches and Wholesalers Serving All Industrial Areas.

CRANE

VALVES • FITTINGS • PIPE • PLUMBING • HEATING

Saves time...money

All steel from one source

When you combine all your steel requirements on a single order to Ryerson you cut costs in many ways. One call—one order—save purchasing time and you also simplify bookkeeping—reduce clerical expense.

In addition, combining most carbon steel purchases under the Ryerson quantity differential plan brings further savings. And with larger quantities you often effect substantial reduction in freight on long hauls.

All these economies are possible when you call Ryerson for steel because Ryerson stocks are the world's largest and most diversified. Carbon steel, alloys, stainless—no matter what analyses you need, no matter what shapes and sizes, you can be practically certain of getting them all with just one call to Ryerson.

You can be sure of prompt delivery, too. So next time you need steel, no matter how many kinds or sizes, call your nearest Ryerson plant.

PRINCIPAL PRODUCTS

CARBON STEEL BARS—Hot rolled & cold finished	**ALLOYS**—Hot rolled, cold finished, heat treated
STRUCTURALS — Channels, angles, beams, etc.	**STAINLESS**—Allegheny bars, plates, sheets, tubes, etc.
PLATES—Many types including Inland 4-Way Safety Plate	**REINFORCING**—Bars & Accessories, spirals, wire mesh
SHEETS—Hot & cold rolled, many types & coatings	**BABBITT**—Five types, also Ryertex plastic bearings
TUBING—Seamless & welded, mechanical & boiler tubes	**MACHINERY & TOOLS**—For metal fabrication

RYERSON STEEL

JOSEPH T. RYERSON & SON, INC.

LOS ANGELES—Plant: 4310 E. Bandini Blvd. Mail: Box 3817, Los Angeles 54. Phones: Angelus 2-6141, from San Diego (no toll), Zenith 6660.
SAN FRANCISCO—Plant: 65th & Hollis Sts., Emeryville. Mail: Box 188, Emeryville, California. Phones: Olympic 3-2933, Enterprise 1-0176.
SEATTLE—Plant: 1200 - 4th Ave. Mail: Box 3268, Seattle 14. Phone: Seneca 2300.
SPOKANE—Plant: North 207 Freya St. Mail: Box 2158, Spokane 10. Phone: Keystone 9311.

Western Industry

NOVEMBER 1953

LET THE FOREMAN CALL SIGNALS ON QUALITY CONTROL

He is the one who can get action on the program; Westinghouse example shows how it works

By

E. L. MALLICK

Quality Control Department Staff Supervisor

AND

J. K. LOGAN

Quality Control Engineer

Westinghouse Electric Corp. Sunnyvale, Calif.

THE FOREMAN plays an important role in any quality control program.

Responsibility for the program itself lies with the Quality Control department. This department determines the amount of inspection to be performed, where and when it shall be performed for properly evaluating quality, and makes the final decision as to whether the quality is satisfactory, but the responsibility for actual production of quality products lies with the foreman or the Manufacturing department.

The above statements stress the essential difference between inspection and quality control. Inspection is the measuring of parts. Quality control consists of three steps: (1) inspection; (2) analysis of the data obtained; and (3) the taking of corrective action based on that data.

For example: (1) The inspector gauges a number of parts from a given operation. (2) On the basis of this information—whether the parts are good or bad (and how good or how bad)—the Quality Control department decides what changes, if any, should be made in the operation.

Step can be simple

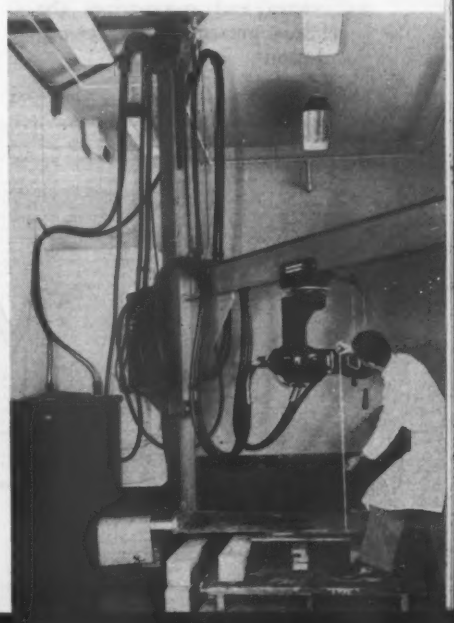
This "analysis" step may be very simple, only calling for the changing of a tool setting, or very complex, perhaps requiring the substitution of an entirely different operation. (3) The corrective action is then recommended to the foreman, and it is up to him to put it into effect.

Most plants, whether or not they have a clearly defined quality control program, usually accomplish the first two steps in the quality control cycle; that is, inspection and analysis. This is logical, since both steps are generally performed by members of the Inspection department, all of whom report to the same supervisor and have only one responsibility—quality control.

However, it is at the third step in the cycle that the quality control system breaks down in many plants; that is, at the "action" step. This occurs partly because the action must be taken by a line foreman who is not under the jurisdiction of the quality control supervisor, and partly because the line foreman does not realize the importance to his operation of following the action recommended by the Quality Control department.

The best way to correct this situation is to convince the line foreman of the advantages to him of becoming an

INSPECTION comes first. Measuring distance from 250,000-volt X-ray to steel casting. This scrutiny may reveal internal defects.



Learning the signals

Here is what the foreman is taught in the quality control course:

- *Introduction to quality control*—Includes the definition, requirements for and benefits of quality control.
- *First piece and patrol inspection*—Explains a system of inspection whereby the tool set-up is OK'd after the inspection of the first part or parts produced, with subsequent inspections of the operation.
- *The foreman and quality control*—Emphasizes that the ultimate responsibility for producing good quality products rests with the foreman. This lesson also covers the use and control of defective apparatus tags.
- *Fraction defective charts*—Covers the basic techniques in using fraction defective charts (P-charts) in manufacturing operations.
- *Average and range control charts*—Covers the theory and use of the X and R chart in manufacturing operations.
- *Applications of quality control*—At this point a review of the first five lessons is given to the foreman in order to integrate the various topics that have been presented.
- *Sampling-sequential analysis*—Explains a sequential sampling plan for use in the acceptance inspection of large quantities of parts.
- *Review of entire course*—Reviews and summarizes the ideas presented in previous lessons.

Source of defective products for a typical machining department

Machining errors		65%
Reading prints incorrectly	33%	
Improper instruction of operators	16%	
Faulty tools	8%	
Carelessness of operator	8%	
Errors and damage in assembly		25%
Damage in transportation		5%
Engineering errors		3%
Miscellaneous		2%
		100%

active member of the quality control team. This is necessary because the first prerequisite to any successful quality control program is that management, from the front office to the shop foreman, must agree that quality shall be controlled.

This problem can be tackled from two angles. The first is through formal training courses designed especially for the line foreman and presented by the Training department of the company. The Training department functions as a neutral "third party" in presenting material, which tends to remove any feeling in the foreman's mind that the Quality Control department is trying to sell him something.

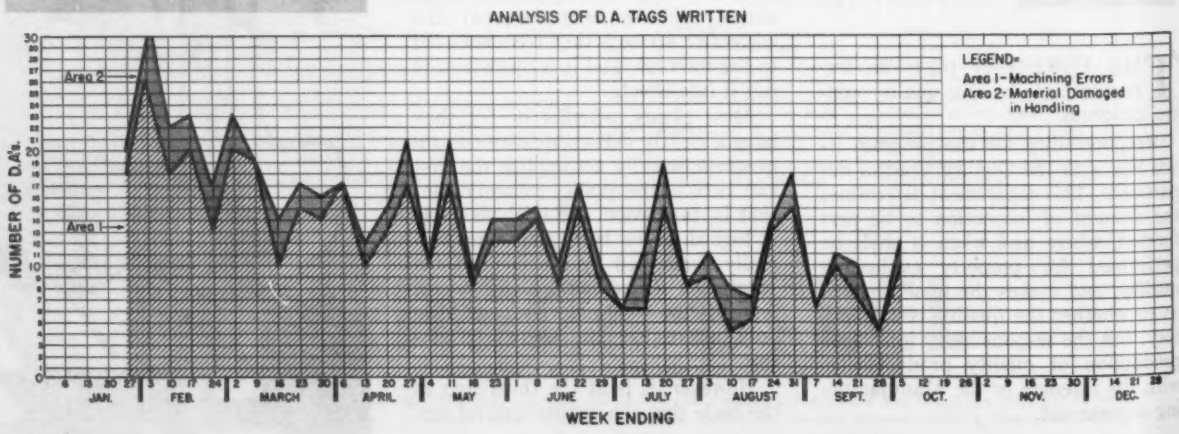
The quality control training course presented by Westinghouse is divided into eight lessons, one lesson being presented at each meeting of the class. In order that the foreman might get actual practice in using the techniques presented, outside work is required between class sessions. These projects include such things as the analysis of defective workmanship in their departments for a given period of time, the setting-up and use of fraction defective charts, and the establishment of first piece and patrol inspection in areas where it is not already in use. In order to give the foremen time to complete outside work, the lessons are given about one month apart.

The second means by which a foreman's full cooperation is obtained follows directly from the training course. It takes the form of a weekly analysis by the Quality Control department of all cases in which a substandard product was produced for any reason.

(It should be mentioned at this point that most production at Sunnyvale is of a "job shop" nature in that large parts, with few parts per order, are produced. This does not permit any widespread use of the standard techniques of statistical quality control, such as control charts, although there are some sections in which they are used.)

Weekly analysis

The analysis of cases of defective product is made at informal weekly meetings held between the line foreman and the inspection foreman or the lead inspector in the department. The inspection representative has a list of the cases of defective products that occurred during the previous week. Each case is discussed, and an attempt



is made to analyze the reason for its occurrence. The cases are grouped in two ways.

(1) By the type of defect, such as machining error, damage in assembly, damage in transportation, etc. When machining errors form a major portion of all errors in the department, they are broken down further into "layout errors," "turning errors," "drilling errors," "boring mill errors," etc. A chart is kept on these classes of defects so that the line foreman knows at all times what is giving him the most trouble.

(2) By responsibility for defects, such as management responsibility, operator responsibility. This analysis shows the percentage of defects produced during the past week that was directly the fault of the machine operator or other hourly employee, and the percentage that was the responsibility of plant management, including foreman, inspector and engineering. A primary reason for this second classification of defects is to help the line foreman pinpoint the source of the errors as the first step in correcting them.

Management errors

It was surprising to note that "management errors" accounted for more than 50% of the errors made in the Sunnyvale machining sections. This figure seems high, but an objective analysis of the facts revealed that management was at fault frequently because the operator was improperly trained, was supplied with improper tools or was given a poor or incorrect print.

It should be stressed that close cooperation between the inspection foreman and the shop foreman cannot be practiced intensively for a short time and then abandoned. Too often a big drive is made to cut down defective workmanship in a shop, then everybody relaxes and hopes the amount of defective workmanship will continue at a lower level. A good start may be made toward improving the quality level in this way, but as the initial enthusiasm wears off, less analysis is made of defective workmanship and the shop is allowed to fall back into its old ways.

When it is suggested that the foreman should make an analysis of the sources of his substandard work, he is likely to object that he already knows the relative abilities of his men. It is probably true in most cases that a good foreman has rated his men as to merit, either formally or in his own mind. However, it is necessary to go beyond this general—and frequently inaccurate—rating and actually accumulate figures on the sources of defective product. The foreman generally knows how much money he spends per year on scrap and rework costs; this is usually charged to a specific account. But, in addition to knowing the total costs, he should be able to break these costs down as to source. Until the foreman can do this, he cannot attack efficiently the problem of scrap and rework.

Intelligent action always requires facts and figures, but too often facts and figures are not obtained on quality problems. This is one reason that the fatalistic attitude is encountered that "our shop just can't do any better." It generally turns out that the responsible persons do not know just how good or how bad their particular shop is.

While the shop foremen may think that a quality control program is a lot of trouble at the start, once their scrap and rework costs come down they are very much in favor of it. After only five years of operation at one of our newer plant locations, this plant became one of the top Westinghouse plants with regard to effective quality control.

Three years ago a certain heavy industrial item built at this plant was rated eighth in quality by a major customer. Today, that customer rates it first over competitive units. Since happy customers make happy foremen, a few such concrete examples will make the foremen happy to be key men in the inspection-analysis-action cycle of successful quality control.

LEFT: Fixing responsibility. Typical chart kept at Sunnyvale plant shows source of defective articles for a single department.

Westinghouse copyrighted definition of quality control

DEFINITION

Quality Control is a system of INSPECTION, ANALYSIS and ACTION applied to a manufacturing process; so that by *inspecting* a small portion of the product currently produced, an *analysis* of its quality can be made; to determine what *action* is required on the operation, in order to maintain the desired level of quality.

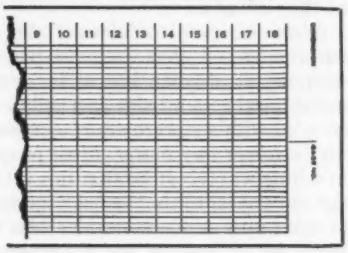
EXPLANATION AND INTERPRETATION

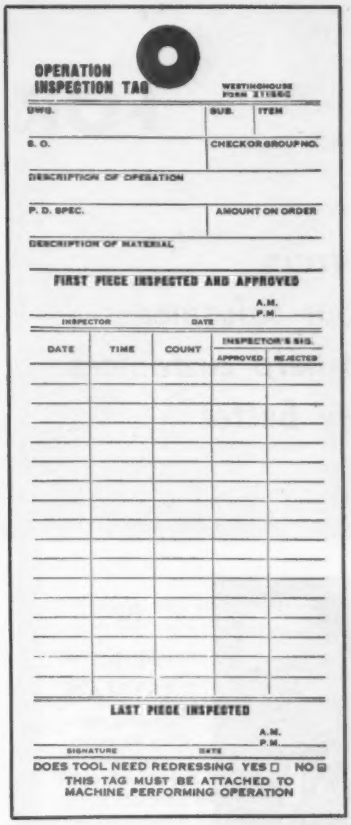
1. Inspection
A small portion of the product is inspected in the regular way, using the gauges and tools usually employed for this purpose.

2. Analysis
Determine the average quality and the extent of variability of quality. Inspection by the method of variables is better than the method of attributes for this purpose.

3. Action
If the average quality is not satisfactory, adjust the process or tools. If the variability is not satisfactory, the machine, or process, in its present condition, is not capable of producing the desired quality level.

TOOL SETUP is OK'd by inspecting the first piece (using tag shown at right). Subsequent inspections are recorded on other side of tag (below).




OPERATION INSPECTION TAG

WESTINGHOUSE FORM 211562C

DWG. | SUB. | ITEM

S. O. | CHECK OR GROUP NO.

DESCRIPTION OF OPERATION

P. O. SPEC. | AMOUNT ON ORDER

DESCRIPTION OF MATERIAL

FIRST PIECE INSPECTED AND APPROVED

A.M. P.M.

INSPECTOR | DATE

DATE	TIME	COUNT	INSPECTOR'S SIG. APPROVED	INSPECTOR'S SIG. REJECTED

LAST PIECE INSPECTED

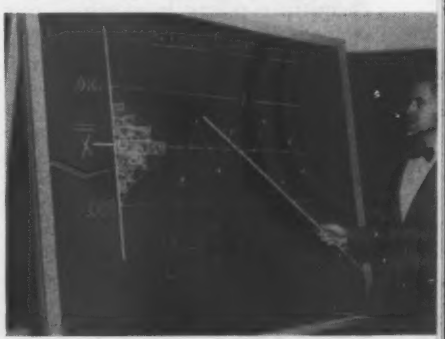
A.M. P.M.

SIGNATURE | DATE

DOES TOOL NEED REDRESSING YES ☐ NO ☒

THIS TAG MUST BE ATTACHED TO MACHINE PERFORMING OPERATION

LECTURE on use of X and R quality control charts for manufacturing operations being given at Sunnyvale. Theory of average and range control is also covered.



FOR INCREASED SALES—

—train your salesmen to help customers buy better

By
H. E. EASTMAN
Purchasing Agent
Clary Multiplier Corportion
San Gabriel, Calif.

I'LL ELABORATE on an old analogy to explain why a purchasing agent is discussing sales and salesmen.

You are, no doubt, weary of hearing your salesmen referred to as "the men on the firing-line." Yet if we hold with this comparison to the military, we can then refer to the top-management men and sales executives as the "top brass." Those strategy men of the "sales army" are the men who project market data and sales analysis material—telescope-like—to focus on their markets, both current and future, and sweep the "no man's land" of competitive selling in search of new methods of attack on the objective.

In many cases that "objective" is a man in the purchasing agent's chair, and as one of those who is often "on the target" I feel that the view through the other end of the telescope could be of value to the "top brass" in preparing their men to stand on the "firing line." At least I can report on the "armament" that scores heaviest and most often with me, and it may influence the thinking of some of those who set up "basic training" programs.

To see the situation as I see it, you should know that purchasing agents hold the same general aim in their work as you do: that is, they want to do the best job that they can within the limits of their ability, temperament and ambition. In addition, charged as they are with spending more than half of the dollars that their company takes in through sales, they have a moral obligation to do their job as efficiently as they are able.

With this point of view, it should surprise no one that the most potent weapons a salesman has at his command are the knowledge and ability—coupled with a sincere desire—*to help his customer buy better*. Most people in selling will recognize that this is the age-old appeal to the "selfish" interest of the buyer, since it enables him to fulfill his obligation and to increase his worth to his company. However, it has a special significance in industry today because management is taking a "new look" at costs.

The "new look"

There was a time when everyone thought of increased sales as the remedy for all business ills. Today, most management men recognize the fact that you can go broke by *doubling* your sales *unless* your costs of production and operation are pegged low enough to provide an adequate margin of return. As a result, these men are demanding lower costs on the goods and services they buy in order to turn out better end-products at competitive selling prices.

In most instances, the cost-studies are a company-wide endeavor, with all departments contributing to the overall analysis and making their recommendations to management. However, the Purchasing department is generally recognized as having the most direct contact with available sources, and the job of actually finding and buying the cost-saving materials and services is left to them.

As one direct result of this, we in Purchasing lean heavily on our vendors' salesmen in our constant battle to keep our costs in line—in our never-ending search for ways to build a better product at less cost. We look to these men—specialists in their respective fields—for advice and help; and my own files contain records of many instances in which they have come through in fine style.

Several years ago, for instance, we were having as high as 6% breakage of plastic covers on our adding machines in shipment. A salesman from International Paper Company called and brought the technical adviser along. He looked into the problem and suggested sending three machines back to their Georgetown laboratory for redesign of our shipping carton.

Thorough tests

They made thorough tests in the laboratory simulating actual conditions and made up what they believed to be a "maximum performance" carton. We tried this on a small order and it reduced our breakage considerably and on subsequent orders, over a period of time, we found that our breakage was reduced to 1%. Shortly thereafter we changed our assembly slightly and the breakage now is practically zero.

Another part called the printer latch pivot tube, consisting of a piece of tube approximately 3 in. long with a $\frac{5}{16}$-in. diameter, was causing us a great deal of production grief. We were buying standard size tubing, reaming the part on the automatic screw machine and then sending it out for centerless grinding. The main problem was holding the reamed hole to size.

A salesman from Perry Kilsby, Inc., was in one day and we referred the problem to him. He suggested that we try to get a special size tube. He developed the data and we placed a trial order. The tube came through exactly to the size we required on the O.D. and the I.D. Tolerances required on the O.D. were 0.178 plus or minus .001 and on the I.D. 0.1275 plus or minus .001. This meant all we had to do was to cut the parts off and groove them on the automatic screw machine and heat treat them. The costs prior to

RIGHT, TOP: Discussing the lever return spring on adding machine are Roy Covington of Connor Spring and Harlan Eastman (in center) and Clary engineers Milton Scorzafava and Richard Mark (on outside).

RIGHT, BELOW: Adding machines and cash registers leaving Clary factory at San Gabriel for shipment to dealers and branches in 48 states and 57 foreign countries.

this suggested change were as follows:

$32.69	per thousand raw material
10.56	per thousand outside services
35.70	per thousand direct labor at Clary
$78.95	total

Using the special size tubing, costs were as follows:

$33.63	per thousand raw material
7.99	per thousand direct labor
$41.62	total

The cost was cut almost in half, using only direct labor figures. The savings would prove to be considerably more if we added overhead. As you will notice, the cost for the raw material is only slightly more than we had been paying for the standard size.

Incidentally, if a salesman is doing a good job we like to let his company know it. He gains the confidence of his own plant management and quite often his sales manager will make a special effort to see that the salesman is better informed on our problems.

Vendor cooperation

Here's another example of vendor cooperation: We use a quantity of special precision springs in our business machines, and springs can be both critical and intricate. The representative from Connor Spring is one of the men who call upon us, and he has spent a great deal of time in working with our engineers in checking exact needs as to tolerances, loads and physical requirements for the springs in our machines. He has available the knowledge of what is considered standard in the industry and works with our engineers in putting this on prints in order that we may get what we need and yet do not have to pay an unnecessary premium. He helps us in setting up standards for test springs.

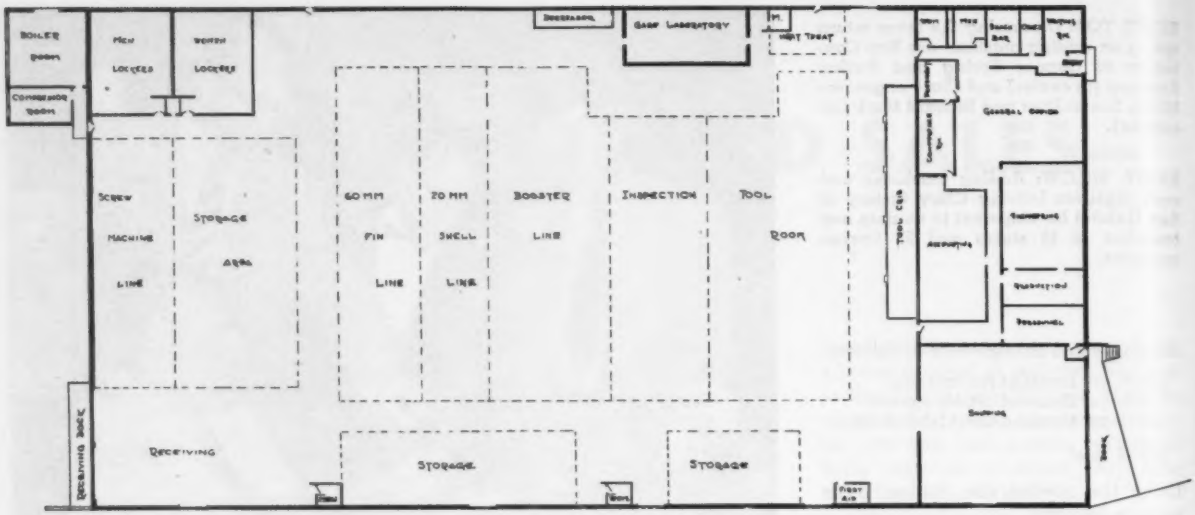
The Connor Spring representative has found other ways in which he can serve us, too. He makes experimental springs for proposed new models. When processing orders in his plant, he informs his plant superintendent to watch for any characteristics which may be improved through adjustment of physical dimensions or wire sizes. If they can make a better spring or a less costly spring by changing some small dimension, they call our Purchasing department and request a change.

A further example

Another example of cost savings due to intelligent selling, plus knowledge of our use of their product, is the story of our saving on electrical terminals. Originally, we were using some terminals for assembly on lead wires which necessitated stripping off the end of the wire, placing the terminal on the stripped portion and crimping the terminal on by means of a hand crimping device. The cost of the terminal was approximately $12.50 per thousand and all of the hand operations were very expensive.

The salesman from Aircraft Marine Products determined that by the installation of their automatic machine and the use of coil terminals, we could make a great reduction in cost of this assembly operation. The cost of the terminals themselves was reduced from $12.50 per thousand to $2.60 per thousand. The terminals are insulation piercing, which eliminates stripping of the wire. All that is necessary is to put the end of the lead wire in the machine, step on the pedal, and the terminal is placed on the end of the wire. This cut the overall cost of this operation to about one-tenth that of the previous cost. The machine did not represent a capital investment because the company issued it on a loan basis and we are merely obliged to buy a minimum number of terminals per year, which we would have done anyway.

These are but a few of the stories from our files, but I think they will help you recognize the salesman who is trained—and has a sincere desire—to help his customer buy better.



LAYOUT of Columbia Electric and Manufacturing Co.'s plant

WINDOWLESS PLANT facilitates

- **ventilation**
- **heating**
- **lighting**

18th article in Western Industry's plant construction series

UNDER TODAY'S diversified yet specialized economy, one of the primary requisites in constructing a new manufacturing plant is the ability to convert from one type of manufacturing process to another.

This inherent versatility was what Columbia Electric and Manufacturing Co. was aiming at in the construction of its new plant near Spokane, Washington.

Columbia Electric is a manufacturer of commercial and industrial lighting fixtures. However, during periods of national emergency the company has been called upon to produce various types of ammunition components under Department of Defense contracts. The new building had to be suitable for both types of production.

No windows

An unusual feature of the plant is that it has no windows. All lighting is internal and the lack of windows simplifies heating and ventilating.

The plant area is equipped with four evaporative coolers, each having a capacity of 13,000 cfm. In the 9,900 sq. ft. of office space a Carrier refrigerator, a self-contained unit with a nominal capacity of 15 tons, controls air flow and temperature. A 5-ton-capacity Carrier refrigerator maintains a temperature in the gauge lab that will not fluctuate more than one degree F. in either direction.

Specifications

Size	200 x 400 ft.
Floor	poured concrete slab
Walls	brick
Roof	wood and asphalt
Heating	unit heaters
Cost	$750,000

The heating plant consists of eight floor-mounted heat distributors with mixing dampers. Each has a capacity of 8,000 cfm., with an adjustable ratio of new air to recirculated air. The office is heated by a ceiling-mounted 5,000-cfm. heat distributor.

Air-conditioned comfort

Reports indicate that this air conditioning and heating system maintains comfortable working conditions even with the doors open in midwinter.

Cost of the 80,000 sq. ft. building was $750,000. Transportation was a key factor in selecting the building site. The plant adjoins one of the main rail lines, is within two blocks of an arterial highway, and is adjacent to a large city airport. The building site is a 10-acre plot of ground affording ample room for parking and further expansion.

Demands of the Army Ordnance

AIR VIEW of the 80,000 sq. ft. plant shows windowless walls and a uniform roof height as well as an ample parking and expansion area.

Corps have forced production lines to fluctuate, and the building is constantly changing in internal complexion. At present there are three production lines manufacturing ammunition components.

Efficiency of operation required a large one-floor plant, devoid of partitions in the manufacturing areas. Construction was accomplished with no internal partitions except in the office area. The roof has a minimum of supports, which allows freedom of movement within the plant. Costly changes have thus been avoided, since production lines may shift and change as new techniques and developments unfold.

Lighting

An outstanding feature of the new plant is the installation of modern, advanced-design lighting fixtures which furnish the entire plant with a high level of illumination. Columbia Electric manufactured and installed its own lighting fixtures. A tribute to its success is the fact that the plant has been acclaimed one of the best lighted industrial plants in the nation. A variety of fixture types were installed, according to the particular need and effect desired.

The general office area is subdivided by fluted opaque glass walls into separate departments. This affords a certain sense of isolation, while the 5-ft. glass walls still allow proper ventilation and circulation of heat throughout the entire office area.

A reserved parking lot adjacent to the main entrance and a modern reception room are provided for guests. A cloakroom and coffee bar located in the general office area are provided for employees. Office furniture is constructed of new matched oak, with accompanying gray metal and leather chairs. Filing cabinets are of matching gray and office walls are seafoam green, especially chosen to complement the illumination.

Eight-inch steel reinforced concrete floors in the building are treated for the elimination of dust. Walls are constructed of new "Titan Red Mission" 12-in. brick with laminated wood-trussed ceiling.

The general office area maintains an illumination level of 80 foot-candles and the general plant working area is illuminated to a level of 50 foot-candles. In the president's office a special application permits a variance of illumination level from 10 to 200 foot-candles. This plastic luminous ceiling brings sunlight inside.

Design and construction have been such that a minimum amount of expense will be incurred in enlarging the length of the building, should this be necessary in the future. Trusses on one end of the building are not finished and the wall at that end is not brick, being finished temporarily in a frame-type construction. The plant's boiler room was also constructed of a sufficient size to take a second boiler in the event of further expansion. All heating units in the plant are run on Bunker C oil. Air requirements for processing are satisfied by a Gardner-Denver 250-hp. compressor.

The electrical system for the entire building is comprised of a 440-volt system distributing through a network of plug-in ducts. Transformers are placed throughout the building to reduce to 220 volts where necessary.

Reports seem to indicate that owners, management and employees are all satisfied with the initial operations of their new plant.

Who did it

ARCHITECT:
Funk, Molander & Johnson

ASSOCIATE ARCHITECT:
William C. James

GENERAL CONTRACTOR:
H. Halvorson, Inc.

SUB-CONTRACTORS:
Electrical: Power City Electric Co.
Plumbing: Arnold & Jeffers
Masonry: Bennet & Sligh
Roofing: Brandt Brothers
Painting: Victor A. Finrow
Plaster: Carl M. Hofseth

SUPPLIERS:
Spokane Woodworking Co.
Building Supplies, Inc.
General Paint Corporation
Northwest Floor Covering Co.
Noise Control of Spokane, Inc.
Beatty Scale Service
Jensen-Byrd Co.
Artistic Iron Works
Layrite Building Materials, Inc.
Potlatch Yards
Overhead Door Co.
Ray L. Hasse
Corey Safe & Lock Co.

A BATTERY of six spindle Conomatics is located in the Screw Machine department. Skillful fluorescent lighting replaces windows in this new manufacturing plant.

More on . . .

DOUBLE PLANETARY geared speed reducer is shown driving a belt conveyor. Planetary gear arrangements have more than ordinary load-carrying capacity because more gear teeth are in constant mesh.

. . . SPEED REDUCERS

Final installment of series on power transmission equipment deals with automatic backstops, planetary speed reducer advantages, and probable future developments

IN THE PRECEDING two installments the nature of speed reducers and increasers has been discussed, with examples of individual applications.

Single and multiple stage reduction, as well as lubrication, maintenance and cooling problems, have been covered.

Individual types explained have included worm, helical and herringbone reducers with chain and V-belt drives.

* * *

A HIGHLY interesting safety device often applied to speed reducers being used to drive vertical or inclined elevators or conveyors is known as an automatic backstop.

This device is fixed to the input shaft of a speed reducer and will not allow the shaft to rotate in reverse in case the mechanism becomes stalled or the power fails. Thus, it will not allow an elevator to drop, or a heavily-loaded incline conveyor to run backward by gravity pull.

The works of the backstop contain slipper shoes which revolve inside a cup-type member. Compression springs operate to force these shoes to grip the wall of the cup-type member when the shaft is at rest. Therefore, it cannot run backward, though it can always be revolved forward. In addition, there are counterweights on the shoes.

When the reducer is up to speed, centrifugal force acting on the counterweights overcomes the compression springs so that the slipper shoes do not rub on the cup-type member of the backstop. Full insurance is provided in the event power should fail for any reason whatever.

Planetary meshing

In a planetary gearing system, a central gear meshes with three planetary gears arranged around its periphery 120 degrees apart on centers. The three planetary gears, in turn, mesh with a surrounding internal ring gear. This ring gear is stationary in its casing. The center gear, or pinion in the case of the planetary of a so-called differential speed reducer, is the high-speed input pinion.

The three planetary gears are yoked together in a special holder. As the center pinion revolves at high speed, the planetary gears and their holder revolve as a unit, though the planetary gears are also revolving on their respective axes. The holder revolves at a far slower rate, imparting revolution to an output shaft made integral with it.

Planetary reducer advantages

A planetary gear arrangement has more than ordinary load-carrying capacity, because more gear teeth are in constant mesh. An additional 1.1 speed ratio is obtained in a single set of such gears. The shaft made integral with the holder in one set of planetary gears can be made to mount a pinion that will act as an input pinion for a second set of gears. This principle can be repeated more than once, and speed reduced accordingly.

One line of planetary or differential reducers is made in single, double, triple and quadruple reduction. Such reducers may be arranged for either horizontal or vertical drive and are available in 35 different sizes, ranging from ¾ to 75 hp., and having a ratio range beginning at 4 to 1 and extending all the way to 1,200 to 1.

Spur gears are used, but the teeth of the gears are made "elliptoid." That is, they are made slightly crowned and slightly thicker at the center of the gear face.

In an arrangement of this type the

input and output shafts of a reducer will be in line, regardless of the number of reductions incorporated.

One self-contained reducer of planetary type has a very interesting lubrication system of forced-feed design. It incorporates a plunger-type pump, operated directly by an eccentric on the low-speed shaft. This pump draws oil through a strainer from an oil reservoir and circulates it through a main feed line to the highspeed bearing and pinion shaft.

The pinion shaft has a drilled passage through which oil is forced and sprayed directly onto the operating gear teeth. This same passage continues to the end of the pinion shaft, supplying oil to the pilot bearing. Oil also passes through auxiliary passages in the planet gear cage to the planet pins.

Planet pins have sizable oil grooves, which carry a continual supply of oil to the planet gear bearings. All oil then flows by gravity back to the reservoir, to be pumped through the cycle again.

Floating planetary element

A highly-efficient planetary speed reducer has a unified planetary element that is free to float. Because of this freedom, it automatically and continually floats into that particular position which establishes equalized load distribution. The teeth on these planetary gears are helical.

Instead of a single planetary gear at each 120-degree spacing around the internal ring gear, there is both a planetary and a secondary planetary gear, the two being made integral. One is of larger diameter than the other.

To accommodate and mesh with both the planetary and secondary planetary gears, two internal helical ring gears are employed instead of one. Internal diameters of these two ring gears vary, so they accommodate and mesh with the different diameters of planetary gears properly.

The frame which holds the planetary gears is supported in place only by those gears and by their hardened and ground alloy steel journals, which turn in bronze bushings in the frame or cage. That is why the assembly is free to float as need appears.

Whether there are very slight inaccuracies in manufacture, or whether slight inaccuracy develops through gradual operating wear, the unit will automatically float to the point where each of the sets of planetry gears does an equal part of the work. This type of reducer allows precise ratios to be worked out with great exactness. Therefore it may be and sometimes is used as an actual timing device. It is also capable of a tremendous ratio range.

A set of spiral bevel gears is sometimes used with a planetary reducer. The resulting spiral bevel planetary reducer is highly efficient, and may be provided with a wide range of speeds. Since a spiral bevel set of gears provides a right angle drive, or "turns a corner," this arrangement combines this advantage with the various advantages of a planetary gear reducer.

Both horizontal and vertical types of spiral bevel planetary reducers are available. The output shaft on a vertical unit may extend either upward or downward. Thus, a reducer of this kind may be arranged underneath, on top or alongside equipment being driven.

Shaft-mounted speed reducers

A recent development in the speed reducer field is a type of lightweight speed reducer equipped with an output sleeve or bushing. This allows it to be mounted directly on the shaft being driven, after which the speed reducer is anchored against rotation.

The input shaft carries a V-belt pulley driven from a closely-adjacent motor. Sometimes a flat belt is used. Gearing in these shaft-mounted reducers is helical. Some firms specializing in this type of reducer make it in both single-reduction and double-reduction type. An automatic backstop is sometimes provided for the double-reduction unit to prevent reversal of direction.

Some shaft-mounted reducers are anchored against revolution by means of a so-called torque arm. The input and output shafts on these reducers are offset a considerable amount. The rod-type torque-arm incorporates a husky turnbuckle by which the rod may be lengthened or shortened.

Because one end of the rod is rigidly anchored, this action swings the speed reducer in some degree around the shaft on which it is mounted and which it drives. This swinging action serves to loosen or tighten the V-belts, without the need for any positional adjustment of the motor.

Another refinement developed and used in connection with these particular reducers is an overload release. This device is both simple and inexpensive yet it protects the machine, motor and speed reducer against shock and overload. Where used, it simply replaces the lower half of the torque arm already described.

If shock or overload occurs, it throws the torque arm (of which the overload release is a part) into compression. This causes a piston to move lengthwise through the overload release, causing the V-belts to loosen and the electric current to be cut off simultaneously. It is possible to hook up a warning system for actuation by this movement, to ring a bell, sound a siren or turn on a warning light.

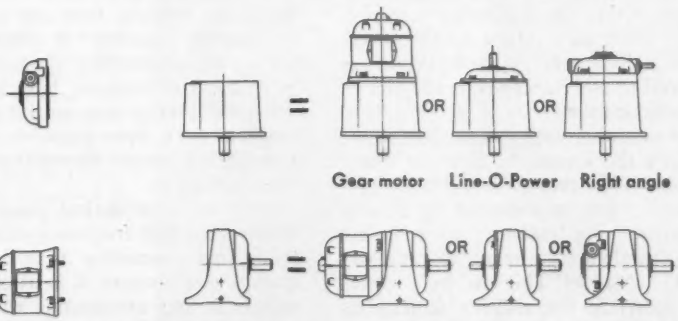
Probable future developments

There is a definite trend, especially in cases where large amounts of power are to be transmitted and artificial cooling can readily be arranged, toward transmitting larger amounts of power in smaller space.

Improvements in gear metals, heat treatments, bearings, manufacturing methods and gear-cutting machines all contribute to the possibility of higher loading of smaller gears without harm.

Experience gained through development of harder and better gears in the aircraft industry is being used in the direction of speed reducers and other geared products. There will, however, be a definite limit in this direction, since use of smaller and harder gears and shaft mountings at higher loads will open the door to greater danger of deflection in parts.

Vertical and horizontal reducer applications



NEW ULTRASONIC INSPECTION SPOTS THE FLAWS BETTER

It permits complete structural view of materials and does not require close contact

CROSS-SECTIONAL "pictures," which indicate with unprecedented clarity the presence or absence of flaws in numerous types of solid materials, are now being obtained on 16-inch television-type cathode tubes by means of a new ultrasonic inspection technique developed by Electro-Circuits, Inc., at Pasadena, Calif.

Known as the "B-scan system," this technique involves the rapid generation of ultrasonic impulses (as many as 1,000 per second) by a search unit which is manually or mechanically moved over the surfaces of an inspection medium. No actual contact between the search unit and the material being inspected is necessary, because both elements are immersed in a fluid such as water (an excellent conductor of high-frequency sound waves).

Ultrasonic echoes

Echoes are produced as the ultrasonic impulses come in contact with the upper and lower surfaces as well as flaws within the inspection material; and, after they return to the search unit, these energy reflections are amplified and impinged on the face of a cathode tube.

A phosphor screen on the latter tube causes the images to glow for many seconds after they are respectively produced. Thus, as indicated by accompanying illustrations, a complete structural view of the inspection material is obtained. This enables a viewer to ascertain the relative dimensions and locations of flaws, if any.

With previously developed ultrasonic test methods, such an evaluation could not be made because the visual images that represented flaws were individually and tentatively produced in a manner that made comparisons impractical. Moreover, it was usually impossible to test materials that lacked relatively smooth surfaces because close contact had to be maintained between the search unit and the surfaces of inspection media.

The latter need for close contact is eliminated by the B-scan system, because ultrasounds of the type that will not penetrate the thinnest layer of air can be efficiently propagated through liquids and solids.

Ultrasonic impulses for the B-scan system are generated by electrostriction—that is, by using radio-frequency current to expand and contract a piezoelectric crystal (usually a quartz crystal). The housing of the crystal in the tubular search unit is such that its output can be beamed at inspection material from any angle.

"Angular beaming" is essential to the accurate evaluation of many types of flaws. For instance, long internal cracks in forgings may appear to have nothing more than pinpoint dimensions if they are not viewed from more than one angle.

Because of acoustical phenomena, which cause high-frequency vibrations to be more sensitive than low-frequency sound waves, it is usually desirable to use ultrasounds with frequencies exceeding one megacycle for nondestructive test purposes. These frequencies are accurately obtained in accordance with the acoustical properties of different inspection materials by means of piezoelectric crystals with varied dimensions.

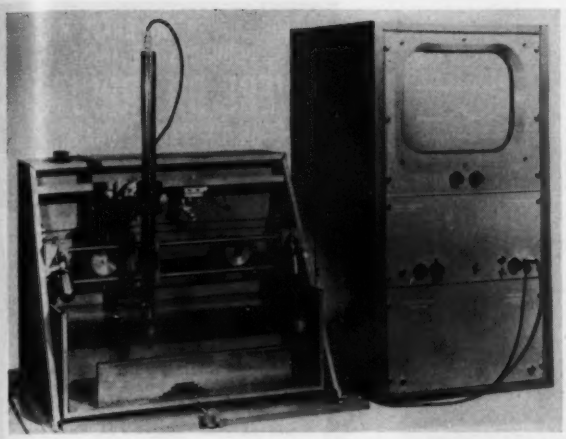
Where contact-scanning methods have been used for the ultrasonic testing of materials, output frequencies have been somewhat limited, because very thin crystals for high output frequencies can easily be scratched or damaged. Where the B-scan system is employed, output frequencies of 5 to 25 megacycles can be consistently generated without damage.

Tank immersion

For a majority of production purposes, it is desirable to immerse inspection materials and search units in fluids retained by tanks for B-scan operations. However, since the tanks may be very large or very small, this does not impose a serious limitation.

Where the use of immersion tanks has been obviously impossible, as in testing underground gas pipes for corrosion, special immersion fixtures have enabled inspection personnel to make effective use of the B-scan system. Such fixtures may have any of numerous design details, but their usual purpose is to maintain a flow of running water between an output crystal and the surface being tested.

Water, being relatively inexpensive and available, is the most commonly-used fluid for immersion-test operations. However, oil and many other



THIS SETUP is devised to ascertain accuracy of the system. Test specimen, immersed in glass-walled tank at lower left, was purposely machined for "flaws" that could be viewed from the side but not from the overhead position of the search unit.

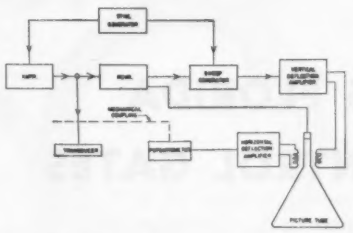
liquids can serve the same purposes—sometimes more effectively. For example, tests have shown that maximum ultrasonic energy can be conveyed to metal test specimens if the latter are immersed in mercury—since mercury is a liquid which is very similar to solid metals in terms of acoustical properties.

When water is used to transmit ultrasonic impulses to an inspection medium, as much as 90% of the crystal-generated energy may be reflected by the upper surface of the test specimen. This is not objectionable as a rule, because upper-surface echoes create an intense visual reference line, and because "secondary echoes" (produced by energy actually entering the specimen) usually have more than enough intensity to be converted into strong visual images.

The visual images produced on a cathode screen by means of the B-scan system may be either larger or smaller than the details of a specimen or area being tested at any given time, since the size of each image is controlled by means of a potentiometer which is mechanically coupled with the search unit. Accordingly, if the potentiometer is properly adjusted, the cross-sectional details of a test specimen with a length of many feet may be compressed and viewed simultaneously on a 16-inch screen; or, conversely, the cross-sectional details of a very small specimen or limited test area may be magnified so that the most minute flaws can be easily observed.

Immersion techniques alone are not new in the field of ultrasonic testing. For example, Brush Development Company of Cleveland evolved one process in this category more than five years ago. However, prior to the development of the B-scan system, the general purpose of these procedures was to use ultrasounds like X-rays.

In the Brush equipment, for instance, ultrasonic impulses are projected by transmitter crystals through inspection materials to microphone pickups in a water-filled tank, so that the presence or absence of flaws can be determined in accordance with the relative intensity of the impulses reaching the microphones. This is an effective method of testing thin sheet, strip, or plate materials; but in other respects it is not nearly as practical as testing procedures which involve the use of gamma radiations or X-rays.



PRINCIPAL electro-mechanical components which permit the use of the B-scan system for non-destructive testing of materials with ultrasound are shown by this schematic diagram.

The B-scan system is not directly comparable to X-ray inspection methods, since it involves the application of an entirely different principle. For example, where X-rays may be satisfactorily used to test extremely porous castings or materials with non-uniform compositions, the use of B-scan facilities is usually impractical because ultrasonic echoes produced by non-resonant media in such materials does not necessarily indicate the existence of flaws. However, the B-scan system can be used in many circumstances where other inspection methods are wholly or partly impractical. For example:

(a) It can be used to locate flaws in materials such as lead and brass alloys which are impervious to gamma radiations.

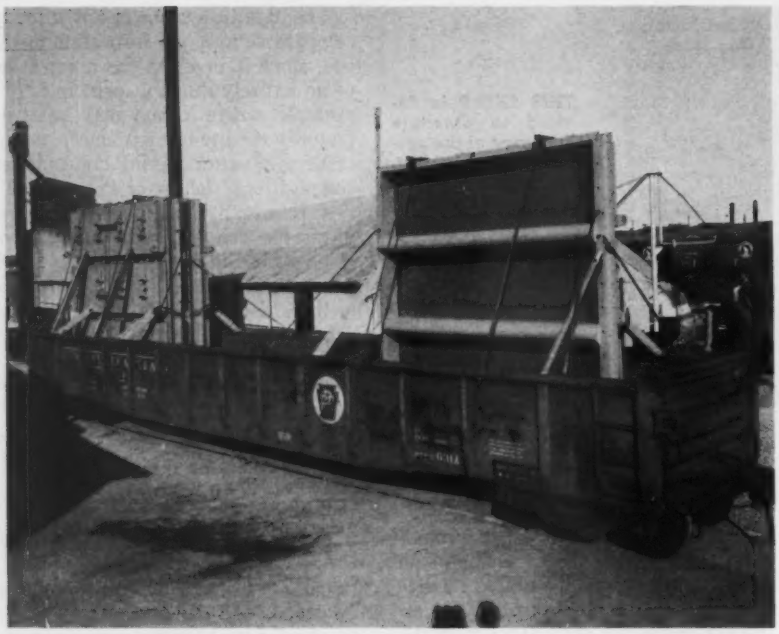
(b) It can be used to test dense materials which are too thick to be X-rayed. For example, an ultrasound can be propagated through more than 15 ft. of solid steel for the purpose of obtaining an inspection echo.

(c) It can be used to detect many flaws such as thin cracks in forgings which would not perceptibly alter the density of an X-ray image.

No radiation hazard

It is further worth noting that, while intense sound waves can be quite destructive, the ultrasounds used for nondestructive testing create nothing remotely comparable to a radiation hazard. In point of fact, similar vibrations are already being used for therapeutical purposes; and, according to recent reports from researchers at Massachusetts Institute of Technology and University of Minnesota, they may soon be widely used as supplements to X-rays for the accurate diagnosis of many internal diseases—including those types of cancer which could not heretofore be identified without surgery.

SPECIAL testing features of this type make it possible to use the B-scan system for testing articles, such as underground pipes, which could not be conveniently immersed in a liquid-filled tank.



All aboard for Palm Beach! Three gates ready for shipment to Florida.

DENVER SUPPLIES FLORIDA WITH FLOOD CONTROL GATES

New shutter type handles 800 cubic feet per second, operates under 50-ft. head

FOR A BIG flood control and drainage project just west of Palm Beach, Florida, shutter gates of a type that apparently never has been built before were supplied by the Pekrul Gate division of Morse Bros. Machinery Company in Denver. They demonstrate the increasing world-wide use of water control gates of all kinds for reclamation work, sewage disposal, water reservoirs, flood control projects, dams, irrigation and industrial water usage.

These gates, measuring 13 x 12 ft. and weighing approximately 17,000 lb. each, will handle 800 cu. ft. of water a second and are designed to operate under a 50-ft. head of water. They were designed specially for the job, tested under exact operating conditions, and they are now being installed under the supervision of the Army Engineers.

Pumping stations on which these gates will be used will not only assist in flood control work, but the artificial lake being built up will create enough pressure on the surface of the land to hold back the inflow of salt water from the ocean which has heretofore destroyed the productivity of the land. This lake will be larger than Lake Okeechobee.

To make 'em watertight

The three shutters on each gate are brass-faced, and the framework of the gate is faced with a specially made rubber stripping so that when shut the gates will be perfectly watertight and allow no backflow or seepage. The steel has all been heat-treated and stress-relieved. Each gate was furnished with a huge transition piece to join from the circular water pipe to the rectangular back of the gate.

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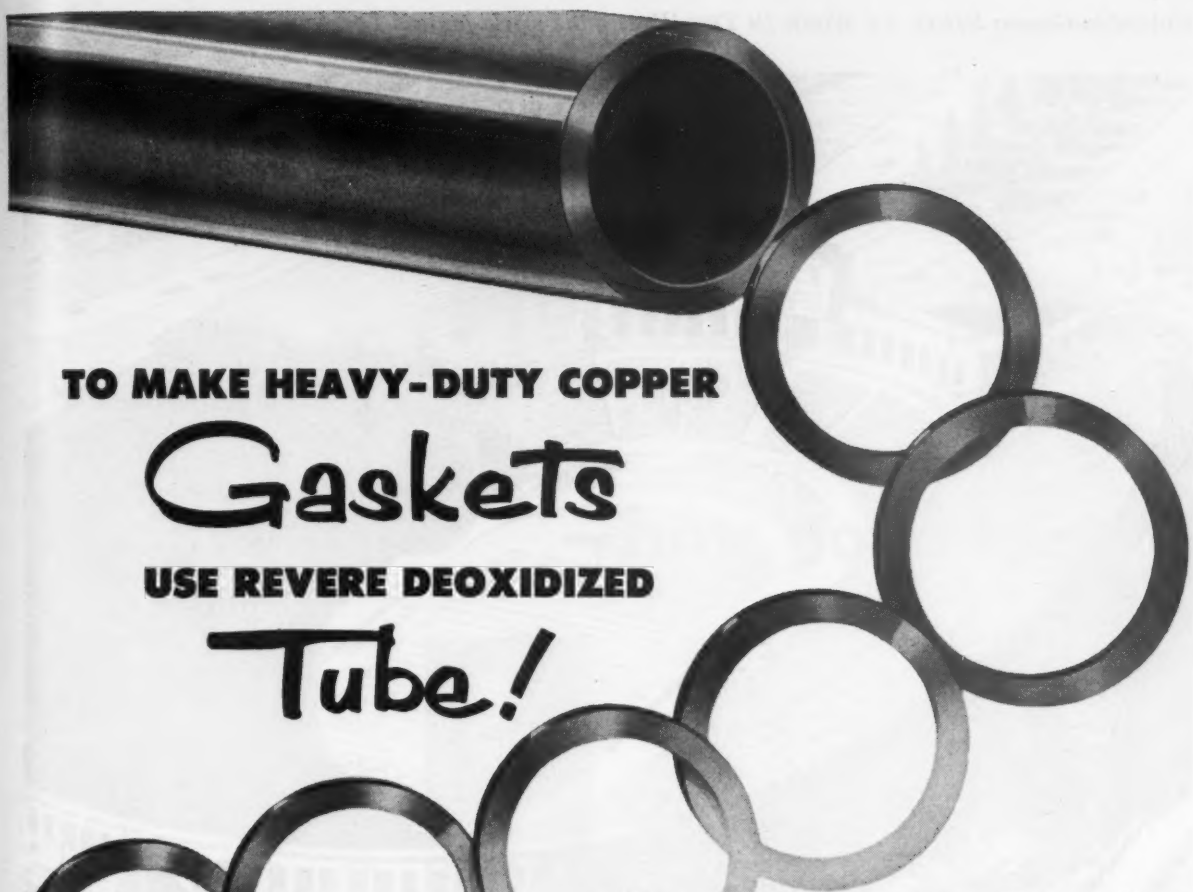

TO MAKE HEAVY-DUTY COPPER Gaskets USE REVERE DEOXIDIZED Tube!

Diesel Fuel Injection Pump, made by American Bosch Corp., Springfield, Mass., and gaskets made by cutting rings off 2" deoxidized copper tube.

• An important extra service rendered by Revere consists of collaboration in setting up specifications. This is valuable because there are many different Revere Metals, each with special characteristics. No one copper, for example, will serve to best advantage in every application. A case in point is the matter of copper gaskets for Diesel fuel injection pumps. Copper is of course an ideal metal for gaskets, and is widely used for that purpose. But for this special application, which copper and in what form? The pump is used on large engines for municipal generating plants. It weighs 186 pounds, and must produce the high pressure required to inject fuel near the top of the Diesel compression stroke. Naturally, the load is a pulsating one. American Bosch Corporation came to Revere with the problem. Our suggestion was that much scrap could be saved if the gaskets were made by cutting rings off copper tube, instead of stamping them from strip. This achieved a double purpose, since the tube is made of deoxidized copper, which is superior in this application to electrolytic. We are able to report that these recommendations proved successful. . . . This work was done by the Revere Technical Advisory Service. To get in touch with it, see the nearest Revere Sales Office.

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Columbia-Geneva STEEL AT WORK IN THE WEST—the world-famous Los Angeles Memorial Coliseum

CITY FOR AN AFTERNOON . . . made safe with steel!

Completed in 1923, the Los Angeles Memorial Coliseum when filled becomes a "city" of 105,000 people. More than 2,000,000 every year view the sports events, civic celebrations, entertainment, and religious services that take place inside this bowl of concrete and steel. And from the mills of Columbia-Geneva came an important share of the steel that went into this largest and finest stadium in America.

For any job, big or small—Columbia-Geneva for years has made steel of many types. Of course, some of these products are in short supply. But we hope that when you need steel, you'll continue to look first to Columbia-Geneva, Western producing member of the industrial family that serves the nation—United States Steel.

West's Largest Steel Producer **COLUMBIA-GENEVA STEEL**

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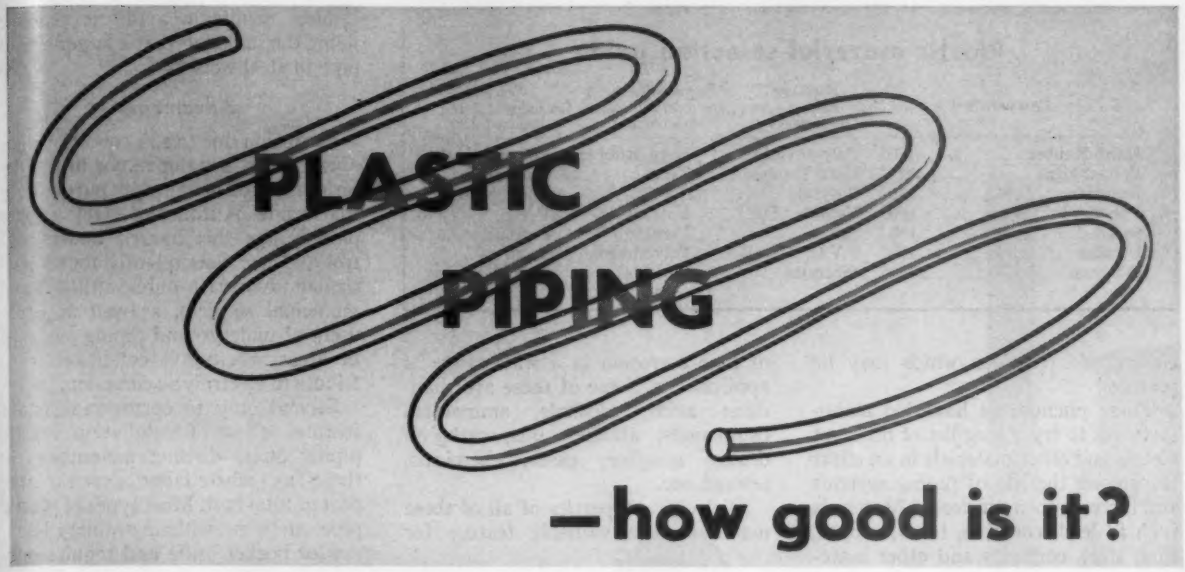

IT HAS BEEN found that plastic pipe, one of the war babies that made good, is not merely a stopgap, but a basic material superior to metal pipe in many cases.

Experimentation has shown that this pipe, extruded from different basic plastic materials, has numerous industrial applications when properly applied to particular requirements of an installation.

Manufacturers of metal pipe have recognized the virtues of plastic pipe and are going along with the trend rather than attempting to combat it. The U. S. Steel Co. is reported to have a standby plant in readiness to meet the situation, and other manufacturers are taking similar steps.

Not an over-all substitute

Experts familiar with case histories on a wide range of industrial applications state that at present plastic pipe is definitely not an over-all substitute for metal having limitations in matters such as temperature, tolerance of sunlight and tensile strength. However, plastic pipe can often be better for a particular purpose and cheaper in the long run than metal piping.

By
ROBERT E. DESHON
Assistant to
Vice President-
General Sales Manager
The Republic Supply
Company of
California
San Leandro, Calif.

Experts believe caution should be exercised in adopting or recommending the use of plastic pipe without technical advice and preliminary investigation. Expert advice should be sought by every prospective user before ordering plastic pipe and its adoption by industry should proceed at a conservative pace.

In order to answer inquiries as to the best application for plastic piping, The Republic Supply Co. of California has made a survey of different types of installation throughout the Pacific Southwest territory and Mexico. Consultation service on plastic piping is now available to the trade without charge.

Corrosion resistance

The main reason for the growing acceptance of plastic pipe by industrial users is its resistance to corrosion. Corrosion can take place both internally and externally in a piping system. Internal corrosion usually results from the pipe material reacting chemically to the liquid being transfused, fouling up the line and often contaminating the flowing material. External corrosion, on the other hand, results from chemical reaction with the soil, adverse atmospheric conditions, fumes from certain bacteria which attack ferrous metals and from

Piping burst-pressures at 70 deg. F.

	¼"	⅜"	½"	¾"	1"	1¼"	1½"	2"	2½"	3"	4"	6"	8"	10"
Polyethylene Krayloy P	....	....	540	350	200	200	200	170	....	....	....	....	....	....
Butyrate Krayloy O—Pipe	....	....	800	920	730	600	655	570	575	500	500	450	425	....
Krayloy O—Tubing (I.D.)	....	1728	1296	864	648	....	....	....	....	....	....	....	....	....
Polyvinyl Chloride Krayloy D 500	....	....	1771	1306	1532	1686	1445	1181	1293	1057	1035	910	905	....
Uscolite Std.	....	....	750	750	625	500	450	375	....	300	300	250	....	....
X. H.	1500	1500	1500	1500	1250	1000	875	750	....	625	625	500	....	....
Saran	....	....	1300	1060	970	820	740	620	570	510	460	400	....	....
Hard Rubber (approx.)	....	250	250	250	250	250	250	250	250	250	250	250	250	....
Fiberglas	....	....	....	....	....	....	....	....	....	....	1000	1000	1000	1000

*Note: Pressures reduce in inverse proportion to temperature increases.

Plastic material selection guide

Temperature		*Pressure* (In order of lowest to highest)	*Impact Strength* (In order of weakest to strongest)	*Price* (In order of lowest to highest price)
Hard Rubber	120°	Polyethylene	Hard Rubber	Polyethylene
Polyethylene	125°	Hard Rubber	Saran	Butyrate
Butyrate	130°	Butyrate	P.V.C.	Fiberglas
Polyvinyl Chloride	160°	Uscolite (Std.)	Butyrate	P.V.C.
Saran	170°	Saran	Uscolite	Uscolite
Uscolite	170°	P.V.C.	Polyethylene	Saran
Fiberglas	230°	Fiberglas	Fiberglas	Hard Rubber

electrolytic reactions which may be present.

These phenomena have led manufacturers to try a long list of different metals and other materials in an effort to prolong the life of piping systems and increase their efficiency. Materials such as lead, concrete, brass, copper, iron, steel, ceramics and other materials have been used. Stainless steel has solved a great many problems of corrosion, but the cost has been prohibitive.

Linings for metal pipe of rubber, concrete, plastics, glass and other materials have had some success, but usually have been less than ideal due to differing coefficients of expansion in the materials, thinness of coatings and, above all, high cost.

The plastic pipe, when properly chosen to meet the conditions in a particular installation, can eliminate corrosion, greatly reduce such conditions as tuberculation, wall-cake and fouling. The flow of friction can be cut to an extent that allows 15% to 40% more flow of liquid than is possible in conventional metal pipe of the same inside diameter. In addition, no plumbing experts or special tools are required to install this pipe, with consequent savings in total costs.

Six basic materials

Plastic pipe is available in six basic types of plastic materials varying as to chemical composition and consequently having different properties. They vary as to corrosion, heat tolerances and tensile strength for resistance to pressure and shock. They also vary as to price. Those we shall deal with here are:

- Vinylidene chloride (Saran)
- Styrene and butadiene copolymer (Uscolite)
- Fiberglas-reinforced polyester
- Polyethylene
- Unplasticized polyvinyl chloride
- Cellulose acetate butyrate (Tenite II)

These materials when made into pipe and sold under various brands have met one or more of the problems of pipe corrosion in a wide range of applications. Some of these are: handling acids, alcohols, ammonium compounds, alkalies, oils, carbohydrates, gasoline, gases, chemicals, sewage, etc.

Dielectric properties of all of these materials is a valuable feature for many industrial applications where the use of metal piping creates this sort of problem.

BESIDES corrosion resistance, ease of installation offers distinct advantages.

The low coefficient of friction previously mentioned, and the consequently greater capacity for handling liquids, results in a plastic pipeline doing the same job that a larger size of pipe in steel would do.

Advantages

Corrosion due to soil conditions has always been a major factor in the deterioration of metal pipe, particularly that made of iron and steel. Plastic pipe brings this hazard under control and has consequently found particular favor with public utilities and municipal services, as well as other users of underground piping systems, in areas where soil conditions contribute to electrolytic corrosion.

Second only to corrosion-resistant features is ease of installation. Plastic piping offers distinct advantages in these days where labor is such a large part of total cost. Most types of plastic pipe can be cut with an ordinary hacksaw or pocket knife and require only the simplest tools for installation. Flexible types of pipe allow numerous turns without elbows or fittings.

Joining of sections is accomplished with either plastic cement or by simply heating the material and laying the ends together. Plastic material may also be threaded like metal piping and is often combined with metal fittings.

Limitations

In determining which type of plastic materials should be chosen to meet the needs of a specific application, all the limitations inherent in plastic pipe should be recognized. For the transfusion of liquids at temperatures in excess of 170 deg. F., plastic piping is not practical. Some plastic impregnated laminate of Fiberglas fabric will tolerate temperatures as high as 230 deg.; however, some other types are not practical when liquids are above 120 deg. F.

Plastic pipe will not burst at freezing temperatures as often happens in

Plastic pipe stocks

Manufacturer	*Trade Name of Product*	*Technical Name of Product*
Krayloy Plastic Pipe Company, Inc.	Krayloy P	Polyethylene
	Krayloy O	Cellulose Acetate Butyrate (Tenite)
	Krayloy D	Polyvinyl Chloride Unplasticized (P.V.C.)
U. S. Rubber Company	Uscolite	Copolymer of Styrene, Butadiene, Acrylonitrile
E. E. Mills	Saran	Vinylidene Chloride
Reflin Company	Fiberglas	Fiberglas Reinforced Polyester
American Hard Rubber Co.	Ace	Hard Rubber

Durasheath: all-purpose power cable

In heavily industrialized areas, utilities can cut their installation and maintenance costs with light, tough DURASHEATH*. This flexible, easily handled cable may be run buried in the earth, in ducts or overhead (or in any combination) without needless, time-consuming jointing. Its light weight and flexibility make duct pulling fast even in zero weather. Aerial assemblies go faster. Linemen like to work with it. And you need stock only one cable type.

* * *

As one of several types of ANACONDA power cables, DURASHEATH is available in all sizes, single or multiconductor, copper or aluminum, from 600 to 15,000 volts. It is thoroughly dependable for industrial plants, railroads, series or multiple street lighting, traffic control, and airport† lighting, residential primaries and secondaries, as well as for such uses as Type USE cable for underground service entrance. *Anaconda Wire & Cable Company, 25 Broadway, New York 4, N. Y.*

*Reg. U. S. Pat. Off. 53313

ANACONDA®

Primary and secondary distribution cables • building, machine tool, control and communication wire • portable cords and cables • bus-drop cables • apparatus cables • copper, aluminum, copperweld conductors • wire and cable accessories.

†*when ordered to CAA Specifications L-824*

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steel piping. However, some plastic pipe becomes very brittle at low temperatures and should not be used where the pipe might sustain impact blows at low temperature.

Pressure limitations and impact strength should also be considered in determining the suitability of plastic pipe. Most types of plastic pipe will deteriorate within five or six years when exposed to direct sunlight for long periods. They will not give maximum performance on outside installations unless buried in the ground where they can remain indefinitely.

Who is using it?

Plastic pipe has served as a solution to corrosive or shortened pipe-life problems in the following industries: chemicals, motion pictures, citrus beverages, gas companies, sewage disposal systems, mining, petroleum, agriculture, water companies, etc.

Southern California Gas Co. has used over 3,000,000 ft. of plastic pipe since 1946 and is currently using 100,000 ft. per month for new installations and replacements. The new plastic product is being inserted directly into the old metal line.

Tenite II is also used in wineries for the transfusion of wines containing 20% to 24% alcohol at temperatures ranging from 18 to 112 deg. F. Results reported over a 4-yr. period have been highly satisfactory.

Superior Oil Co. has recently laid more than 4,000 ft. of plastic pipe for a water system. W. W. Pauley Oil Co. has also installed a water system on its properties in order to cool salt water so that it can be diverted to the local sewer system at a 120-deg. maximum.

Hawaiian pineapple producers have found Uscolite piping systems the answer to the old technical problem of corrosion from fruit juices.

Paper mills are also using this pipe as a means of meeting the corrosion problems created by chemicals used in their manufacturing processes.

The volume of sales for plastic pipe is still only a fraction of the total market for steel pipe; still, manufacturers are anticipating a volume of 20 to 30 million dollars for 1953. This is a third higher than the volume for 1952. It has been estimated that the combined sales volume of agriculturists, mining companies, oil well operators, gas companies, plus the needs of the chemical industries, will eventually amount to $250,000,000, or about 1/5 of the present United States yearly market for pipe of all kinds.

Physical characteristics of plastic piping

	Polyethylene	*Butyrate or Tenite*	*Polyvinyl Chloride*	*Saran*	*Uscolite*	*Fiberglas*	*Hard Rubber*
Appearance	Silver grey or black. Waxy feeling.	Transparent. Clear or glossy. Black-shiny. Sour odor.	Industrial dark grey. Slightly distinctive odor.	Black-shiny.	Industrial light grey.	Greenish color. Glass fibers visible in resin.	Grey black. Very dull.
Temp. Range (constant working)	—50 +125° F.	—20 +130° F.	10 +160° F.	0 +170° F.	—20 +170° F.	—90 +230° F.	0 + 120° F.
Pipe Sizes available	½ — 2 OD IPS Lgths—Coils	½ — 6 OD IPS Lgth. 20′	½ — 6 OD IPS Lgth. 20′	½ — 6 OD IPS Lgth. 10′	⅛ — 6 OD IPS Lgth. 20′	4″ — 10″ OD nominal . Lgth. 20′	¼ — 8 OD IPS Lgth. 10′
Tubing Sizes available	None	¼ — 1″	¼ — 1⅛	⅛ — ¾	None	None	None
Pipe Fittings—Type used	Insert type with clamps.	Sleeve type with solvent cement	Sleeve type with solvent cement	Threaded and heat weld	Threaded.	Resin wrap cement type.	Threaded and flanged.
Size range	½ — 2	½ — 6	½ — 4	½ — 2	½ — 2	4 — 10	¼ — 8
Advantages	Low price. Inexpensive to install. Flexible. Long lengths. High impact strength. Non toxic. Abrasive resistant.	Low price. High flow factor. Ease & economy of installing & applying fittings. Transparent.	High tensile strength. High pressures. High corrosion resistance. Low price. Sunlight doesn't harm. Inexpensive to install. Simple type of fittings.	High corrosion resistance. Good range of threaded fittings.	High impact strength. Good range of threaded fittings. Low expansion. Resistance to abrasion. High corrosion resistance. High temperature range.	High temp. High pressures. High impact strength. No cold flow. Non toxic. Large sizes available. High corrosion resistance. High flow factor Sunlight does not harm.	Non toxic. High corrosion resistance. Wide range of fittings. Rigidity.
Limitations	Low pressure & temp. range. Solvent in crude oil. Cold flow. Can't be exposed to direct sunlight.	Non toxic but with slight odor. Can't be exposed to direct sunlight.	Brittle in low temperature. Impact strength	Low impact strength. High priced. Should be kept out of direct sunlight.	Should be kept out of direct sunlight.	No small sizes. Type or method of connections. Short range of fittings.	High price. Brittle. Low impact. Difficult to thread. Low temp. Low pressures.
Best Applications	Low press. water service. Low press. & low temp. corrosive solutions. Jet wells. Irrigation pipe. Mines. Conduit.	Sour crude oil. Salt water disposal. Gas. Water lines. Long pipe lines.	High press. lines. Corrosive service Sour crude oil. Salt water disposal. Long pipe lines.	Highly corrosive service. Short ind. pipe installations.	Corrosive service Short ind. pipe installations.	Large diam. lines Salt water disposal. High temp. corrosive service. High press. lines	Corrosive uses where no other plastic will work.

If you want "Thru-the-Air" handling at its low-cost best, you can't beat this — a *genuine* P&H Zip-Lift Electric Hoist with rope control . . . only $199.50.

This new "Zip" is built to give you years of trouble-free service — *guaranteed* to withstand an occasional overload up to 25% more than the rated capacity. Other important advantages include real wire rope hoisting for wider side pull, double brakes for double safety, and easy installation (just hang it up and plug it in).

Yes, here's the number-one buy in the low-cost hoist field — the new Zip-Lift ready to save time and money for you. Check the many ways "Thru-the-Air" handling can cut your *costs*. Ask your nearby P&H Dealer to give your plant the once-over. His advice will cost you nothing — and he will save you money. Call him today!

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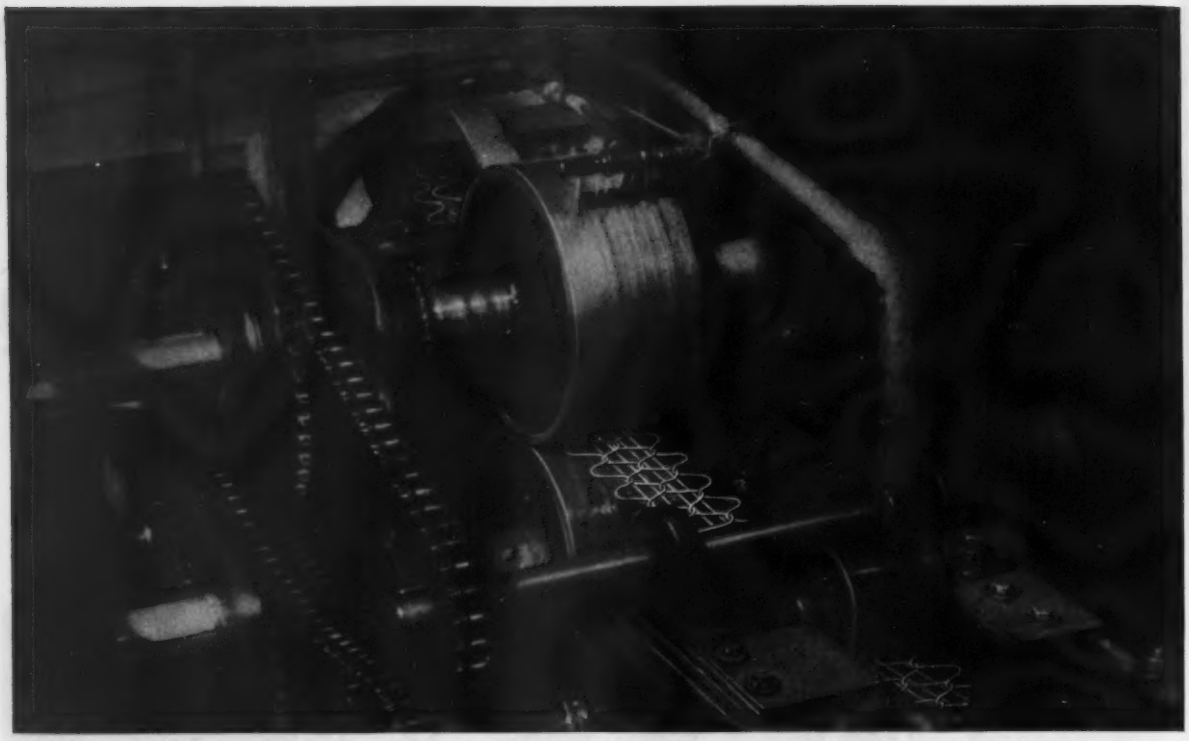
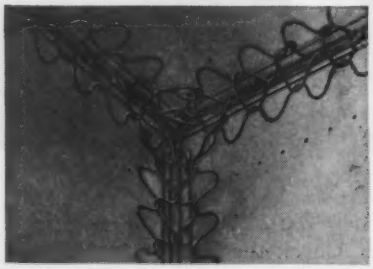
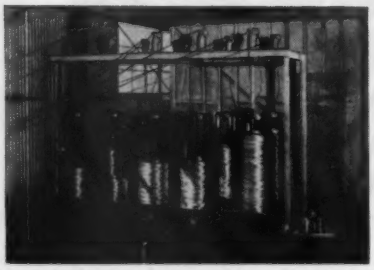


This high-speed wire mesh machine electrically welds together eight separate strands of high quality U·S·S Manufacturers Wire in making self-furring plaster reinforcing at the Ray F. Stockton Co., Inc. in Burbank, California.

New plaster reinforcing gives greater strength



Inside corners and ceiling angles are stronger and truer when these plaster reinforcing strips are used. Besides the 18-gauge wire used here, there are more than 1000 other types, grades & finishes of U·S·S Manufacturers Wire available. Columbia-Geneva also can produce tailor-made wire to your specifications.



Reels of wire feed continuously into the wire mesh machine. The company uses over 125 tons of U·S·S Manufacturers Wire every month in fabricating this product. Columbia-Geneva, with the greatest wire-making facilities in the West, produces wire for everything from coat hangers to heavy, woven fencing.

Ray F. Stockton, right, President of the company, is shown here examining a coil of wire with a Columbia-Geneva specialist. Mr. Stockton reports, "We're completely satisfied with the performance we've gotten from U·S·S Manufacturers Wire. It forms easily, and is always of uniform high quality."

For uniform, high-quality wire, rely on U·S·S Manufacturers Wire. It's production is rigidly controlled by United States Steel from raw ore to the finished product. Columbia-Geneva specialists are always available to help you select the wire that's right for your job. For information write to Columbia-Geneva Steel Division, United States Steel Corporation, 1403 Russ Building, San Francisco 6.

Columbia-Geneva produces wire that's tailored to fit your needs

U·S·S Manufacturers Wire

Columbia-Geneva Steel Division, United States Steel Corporation, San Francisco

UNITED STATES STEEL

EFFICIENCY KINKS

Plastic coating problem

IN DESIGNING a new automobile roof-clamp fishing rod carrier, Del-Air Products, Los Angeles, had to completely protect the basic steel structure from rust and corrosion. This was to be done with a special protective coating which would resist weather, salt spray and would have to protect car finish and the fishing rods, skis, or whatever the load. In addition, it had to be good looking.

A special vinyl plastic formulation was determined to be excellent for the purpose but no organization was available to do the coating process in production quantities. So Del-Air designed a special dipping facility to solve their own problems.

The process involves (1) dipping the metal part in the tank of plastic, (2) draining excess fluid plastic, (3) passing the dipped part through temperature controlled oven to set the plastic coating.

The major problem in plastic coating metal products of this type is the difficulty in eliminating unsightly runs and drips. However, the conveyor system designed for this particular oven has eliminated that problem almost entirely.

An essential of the development was that catches on the conveyor permit quick connecting and disconnecting procedures, yet ensure a rigid attachment to the conveyor. This problem was solved by means of modified cabinet catches. The cabinet catch hanger arrangement permits quick connect-disconnect procedures while maintaining rigid connections to the conveyor.

Plastic excess drains off the part while traveling under the oven to the far end. There the conveyor rotates the part up into the oven, thus bodily inverting the part so that any remaining drip or dimple is diffused back over the surface and so disappears. The operator then removes the finished part as it emerges from the near end of the oven free from unsightly runs and drips.

Light projection aids inspection

BY USE of a new method involving light projection and photography principles, Northrop Aircraft, Inc., Hawthorne, California, has solved a problem of inspecting transparent plastics, particularly useful in producing the Scorpion F-89 for the U. S. Air Force.

Equipment required consists of a three-hole camera, a projector and a grid system.

It was found that pilots often had difficulty seeing clearly in looking at certain angles through curved sections of windshields. The distortion took various forms, and there was no way of detecting the amount of distortion.

Transparent plastic to be inspected is set into place at a certain distance and angle from the camera and the wall grid. Camera and projector are lined up to correspond to the angle from which the pilot would naturally look through the glass. A projector is used which contains a slide with grid markings. The grid in the slide is lined up with the wall grid and the projected light coming through the inspected material is viewed from the side.

Distortions appear as deviations from the standard grid, and consist of bending of lines, wavering of lines, and combinations of the two. Glass is divided into areas, the most critical being the ones offering the most visibility to the pilot, while those portions in the corners or along edges are less critical.

When all the equipment has been set up the three-hole camera photographs the grid pattern result. The inspector then runs the negative on a projector and sees on the screen the unbiased results of the three-hole camera. On a distortion-free panel the three superimposed pictures will align themselves as one. If distortion is present, one or more of the pictures will be out of alignment.

Use of the inspection method has raised the acceptance rate on F-89 windshield panels to approximately 98 per cent. The method is also being adapted by Northrop as a checking system for the correction and development of forms, molds and other types of tooling.

Rolling scaffolding

A PORTABLE rolling scaffold, consisting essentially of a plank with some rollers on the bottom, is making roof work easier and safer at the Torrance, California, plant of The National Supply Company. The scaffold is used in putting studs on roof purlins preparatory to new roof installation. Previously, when it had been necessary to replace worn corrugated metal roofing, a man had to stand on the slippery iron sheet, bend over open space and reach out two feet or more to put the studs in place. This is not only slow and dangerous but also very tiring.

Martin Kvilvang, a company employee, designed the scaffolding now in use. Rollers, on the bottom of the scaffold, are placed at the proper distance so that the whole contrivance rolls along the roof purlins. A seat mounted at an angle to the roof compensates for roof slope. A workman, seated on the scaffold, pushes himself along with his feet and has only to lean forward to use his stud gun. His material is handy and the box is in front of him.

Atomic safety hazard licked

A MINOR step in producing plutonium at the Hanford, Washington, plant is a centrifuging operation in which two heavy pieces of uranium metal are cleaned by whirling action. Until recently, the centrifuge had no lid, and the operator put it into action by stepping on a foot switch. Occasionally one of the pieces left its centrifuge seat and was ejected at very high speed into the working area.

To overcome this safety hazard, a lid was installed and was made neglect-proof by tying it into the starting system. The foot switch was replaced by a single-pole, single-throw switch placed in such a way that lowering the lid closed the switch. The switch is in series with a timer. When the lid closes the switch, current passes through the circuit of the centrifuge motor and at the same time actuates the timer. This latter reopens the motor circuit after six seconds.

If the lid is inadvertently raised before the time cycle is over, the switch, timer circuit and centrifuge motor circuit open in quick sequence. Dynamic braking then quickly decelerates the centrifuge. Thus, the device can only rotate when the lid is in the safe, or closed, position.

Contributions wanted . . .

Western Industry **will pay $5 for each contribution to this department that merits publication. Send in details of how your plant solved some design, production, maintenance, or other problem.**

Write to Efficiency Kinks Editor, 609 Mission St., San Francisco 5, Calif.

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Packaging and materials handling show scheduled for mid-August 1954

THE FIFTH Western Packaging and Materials Handling Exposition will be staged in San Francisco August 17-19, 1954, it is announced by Clapp & Poliak, Inc., national exposition management firm.

After three expositions in San Francisco, Los Angeles was chosen in 1952 and the affair developed an attendance of 7,000. A materials handling and military packaging conference, for which *Western Industry* was one of the sponsors, was held concurrently.

San Francisco was chosen for 1954 after a poll of all the exhibitors of the four previous expositions was taken, according to Saul Poliak. He said:

"The phenomenal growth of Western industry has proceeded hand-in-hand with packaging and materials handling methods of its own, created to suit its own purposes. This growth is not slackening, and almost daily new ideas and methods are being born.

"This Exposition serves to encourage the development of packaging and materials handling services peculiarly Western. It is the rallying point around which the technology of the field is being built."

The Western Packaging and Materials Handling Exposition is sponsored by a board of 27 top executives of the West's leading firms in the packaging and materials handling industries. They are:

Don L. Abshire, The Goodyear Tire & Rubber Company, Inc.; Peter D. Bowley, Peter D. Bowley and Associates; Robert H. Braun, Robert H. Braun Company; Thomas E. Bruffy, The Dobeckmun Company; Glory P. Carlberg, Zellerbach Paper Company; T. J. Costello, Reynolds Metals Company; John C. Fischer, Sherman Paper Products Corporation of California.

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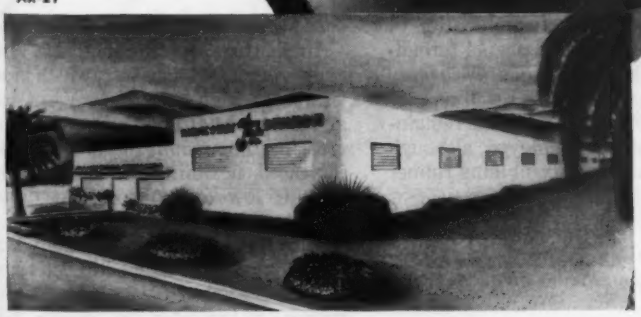

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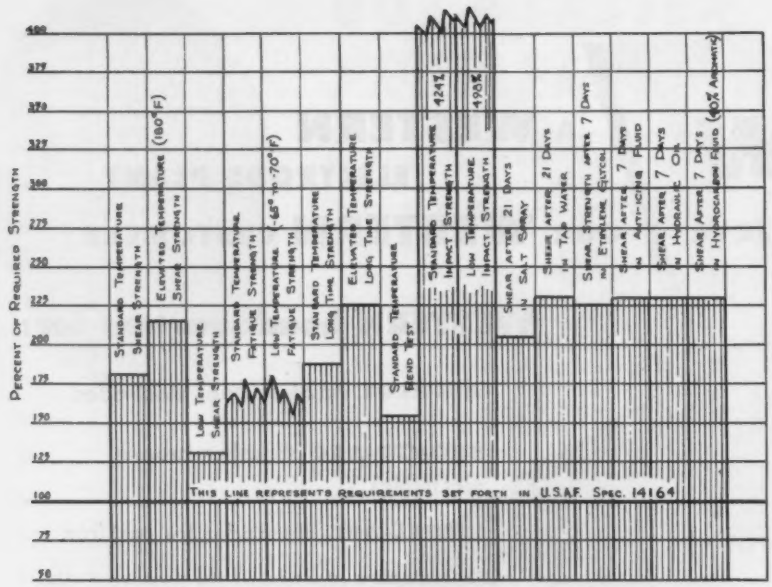

Chart compares strength requirements set up by U. S. Air Force and strengths obtained with the new high temperature metal-to-metal adhesive system.

NEW ADHESIVE FOR HIGHER TEMPERATURES

By S. E. SUSMAN
AND
G. R. TALBOTT
Narmco, Inc.
San Diego, Calif.

AS AIRCRAFT are designed to fly higher and faster, their operating temperatures become more extreme. Structures personnel were confronted with a problem of finding materials capable of operation in ever expanding temperature ranges. Many contracts were let for investigation of existing materials and for development of new ones.

Valuable for fabrication

Metal-to-metal adhesives have established themselves in the aircraft industry as valuable fabrication materials and are used in many applications in preference to rivets, bolts or welds. However, as these metal-to-metal adhesives are primarily of organic composition, the majority of them are unsatisfactory at high temperature.

Our company, a derivative entity of National Research and Manufacturing Co., was founded by Dr. Glenn G. Havens, a physicist. We have had considerable experience in development and application of metal-to-metal adhesives and were given a contract for developing an adhesive which would offer satisfactory performance at temperatures from minus 70 to plus 260 deg. F.

First an attempt was made to modify Metlbond M3C, a combination of chloroprene rubber and phenol-formaldehyde resin. It was soon discovered that new components, as well as new ratios of any component to the remaining ones, must be employed, although a general pattern of combining rubber and resin was followed.

MACHINERY RECORDS tensile shear strengths of bonds formed with Metlbond 402-2021.

Many development problems were encountered. For example, it was found that the ratio of resin to rubber is extremely critical. Very slight variations here can cause surprisingly great differences in tensile shear strengths of bonds formulated with the adhesive.

Ratios

Increasing the amount of resin causes increased hardness, which is desirable at high temperature but disadvantageous at low temperature. Increasing the amount of rubber causes increased flexibility, which is desirable at low temperature but disadvantageous at high temperature.

It may be inferred immediately that much time was consumed in determining the optimum balance of resin to rubber, as indicated by variations in tensile shear strengths of bonds formulated with experimental adhesives and tested over the entire temperature range, from minus 70 to plus 260 deg. F.

Adhesives having the best high temperature characteristics were found inadequate at minus 70 deg. F., while conversely, those having the best low temperature characteristics were found inadequate at plus 260 deg. F. A compromise was reached in which a best

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"over-all" adhesive was selected.

It was next necessary to secure an adequate storage life for the adhesive. The components of most organic adhesives include reactive accelerators which act on the resin and rubber, causing polymerization, or "cure." An important step in developing an adhesive having adequate shelf life comprises selection of an accelerator which is active only at elevated temperature, and wholly inactive at temperatures used in storage. A third development problem was solved when this accelerator was found.

Solution adhesives are adequate, but most of them have a serious disadvantage in that one must remove solvent by drying. Otherwise, the adhesive will bubble and froth during cure, which causes poor contact to metal surfaces, resulting in low strength bonds.

Advantages inherent in 100% solids tapes or pastes will be appreciated in view of this. Our final problem consisted in developing a two-part system of prime and tape so that the main body of adhesive would be in a solid state throughout the curing cycle.

The prime finally chosen consists of a 10% solution of the solid tape, and the tape finally selected consists of a calendered and unsupported film of the solid materials. Tape is easier to handle, and has better shelf life than do solutions.

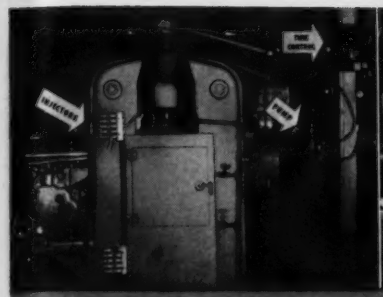
The tape is denoted "Metlbond 402," and the prime is denoted "Metlbond 2021." This two-part system has been qualified by Wright-Patterson Air Base under U. S. Air Force Specification No. 14164. Also, Metlbond 402-2021 yields aluminum-to-aluminum joints having elevated temperature strengths well in excess of requirements set by USAF No. 14164.

Tensile shear strength at plus 260 deg. F. is over 2,000 psi.; at plus 350 deg. an average of 1,500 psi. was obtained, and at plus 500 deg., 1,000 psi. was obtained. Thus, the program has been successful, and Narmco, Inc., personnel are pleased with the results.

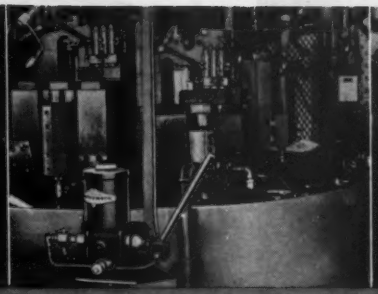
RESEARCH AWARD

BRUCE B. FARRINGTON, California Research Corp., San Francisco, has been named recipient of the National Lubricating Grease Institute's first annual award for the outstanding contribution to lubricating grease industry.

Farrington, administrative assistant to the manager of petroleum products research at Cal Research, subsidiary of Standard Oil Company of California, was honored for his electron microscope investigations into the real structure of lubricating grease.



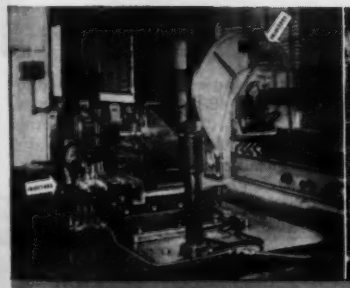
1 REDUCES REPAIRS
Lincoln Centralized Lubrication INCREASES BEARING LIFE 1500% ... power consumption reduced 30%. The Miller Company.



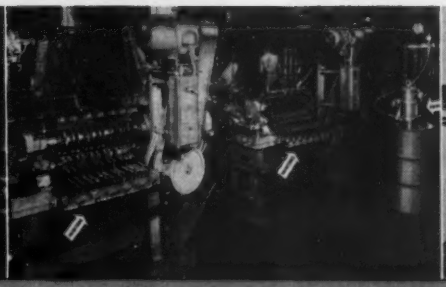
2 PRODUCTION INCREASED
Production increased 20% ... equal to twelve new machines costing $816,000. And, $100,000 saved in maintenance, bearings, etc. Spicer Manufacturing Company.

3 CONSERVES MANPOWER
Lincoln System saves $32,240.00 a year in labor alone in coal preparation plant. Hanna Coal Company.

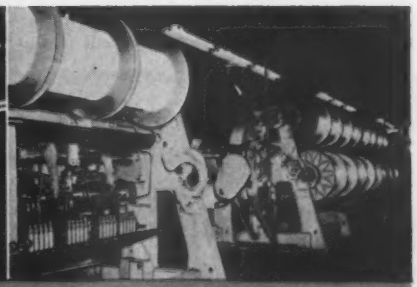
6 REASONS WHY
industry is installing *Lincoln* CENTRALIZED LUBRICATION SYSTEMS



4 REDUCES LUBRICANT CONSUMPTION
Lubricant consumption has been reduced by 50% and production increased. Cudahy Brothers.



5 REDUCES REJECTS
Rejects slashed 80% ... production increased ... operator efficiency increased. Motor Car Manufacturer, Flint, Michigan.



6 REDUCES POWER CONSUMPTION
Power cost reduced 20%, production increased 22%. Konit Mills.

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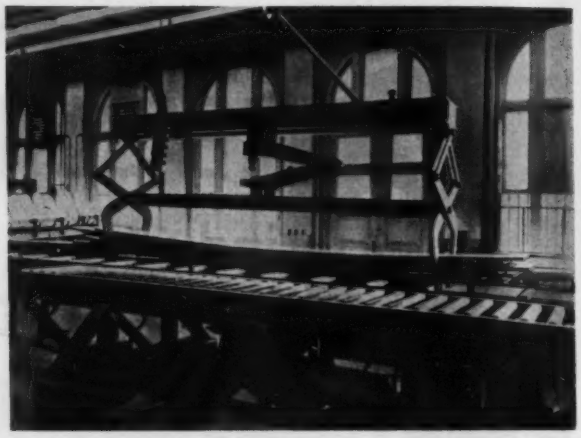
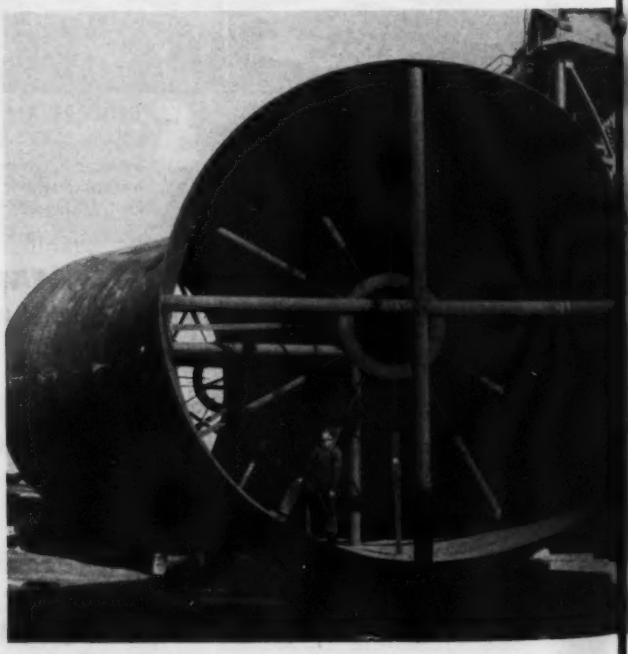
WESTERN PROCESSES AND PRODUCTS in Today's View

VANCOUVER, WASH.—Aluminum ingots, each weighing more than a ton, are being cast experimentally at Aluminum Company of America's plant. They soon will be produced interchangeably with extrusion ingots. The latter will be further fabricated in Alcoa's extrusion mill at the Vancouver plant.



DENVER, COLO.—All eight slabs being carried by these automatic tongs at the U. S. Mint represent 400,000 shiny new dimes. Slabs are composed of 90% silver and 10% copper. Tongs have a capacity of 12 slabs with a total weight of 5,760 lb. and a coinage value of sixty thousand dollars.

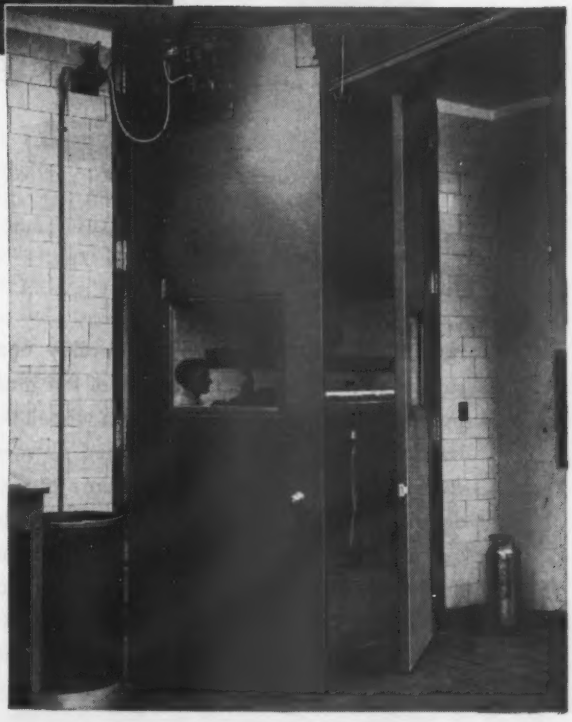
SAN DIEGO, CALIF.—Solar Aircraft Co. is manufacturing these stainless steel augmentor tubes for the Convair-Liner 240. Their application will utilize exhaust gases, giving the plane extra thrust, helping to cool the engine, and providing warm air for cabin heating and anti-icing.



SOUTH SAN FRANCISCO, CALIF.—A steel elbow, made of one-inch thick plate and weighing 86 tons, is assembled at United States Steel's Consolidated Western Steel division before shipment to Chief Joseph Dam on the Columbia River near Bridgeport, Wash. Warren Wise examines temporary bracing.

Richards-Wilcox Automatic Door Operators

Smoother! Safer! More Efficient!



Electronic time-savers for industry

No. 1512 Aut-O-Dor Operator for sliding doors. One operator, No. 1512, can be adapted to bi-parting doors, as shown above, by the addition of a cable attachment for door, not connected to unit. Designed for smaller openings where a pair of sliding doors or a single sliding door is most practical, with maximum opening of 5 feet for single door and 10 feet for bi-parting doors. Supplied in ¼, ⅓, or ½ HP units; single or polyphase AC with overload and underload protection.

No. 1508 Aut-O-Dor Operators for pairs of swinging doors. For low-cost, automatic operation of a pair of swinging doors, the 1508 single operator mounts on one door, but smoothly activates both by a simple mechanical linkage. Standard units have either a cable switch or push button control. Activation by radio, magnets or unseen light beam is optional equipment. Operation from inverted installation on lintel above door may also be obtained. Supplied in ¼, ⅓ and ½ HP units for openings up to 12 feet wide. Operator may be single phase or polyphase AC, overload protection is provided. Doors may be stopped at any point during operation and direction reversed.

For complete information write for descriptive catalogue.

Richards-Wilcox Mfg. Co.

"A HANGER FOR ANY DOOR THAT SLIDES"

Branch Offices: **909 Santa Fe Ave., Los Angeles 21**
Builders Exchange Bldg., 666 Mission St., San Francisco • 6903 57th N.E., Seattle 5

1880 — RICHARDS WILCOX R-W AURORA TRADE MARK Reg. U. S. Pat. Off. — 1953

SLIDING DOOR HANGERS & TRACK • FIRE DOORS & FIXTURES • GARAGE DOORS & EQUIPMENT • INDUSTRIAL CONVEYORS & CRANES • SCHOOL WARDROBES & PARTITIONS • ELEVATOR DOOR OPERATING EQUIPMENT

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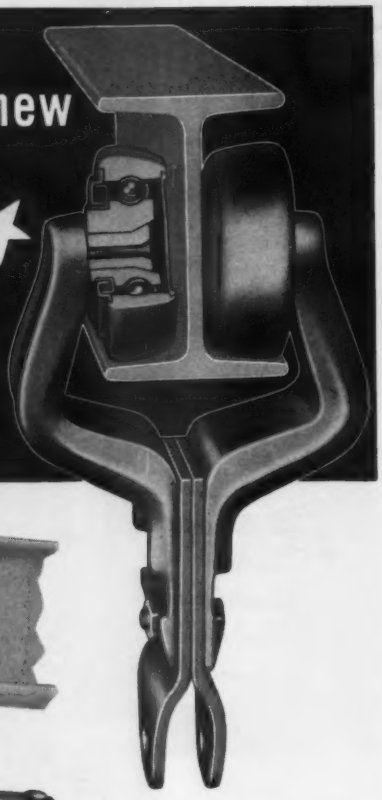
MATHEWS
LOADSTAR ★
a spectacular
performer in the
fine trolley field



★ Complete Loadstar assembly with TB-4351 brackets and X-458 chain.

★ No. 4207J Loadstar wheel, cutaway showing felt and steel seal.

★ Here is a completely new trolley conveyer designed to meet the requirements of the most exacting purchaser. A top-quality precision wheel, the No. 4207 Loadstar is the heart of this rugged newcomer to the 4" trolley conveyer field. Five years of research and development by Mathews Engineers are behind this exceptionally fine trolley which is recommended for the overhead conveying job demanding stamina and continuous trouble-free performance. Write for Bulletin LS1, announcing and describing this new trolley.

MATHEWS CONVEYER COMPANY WEST COAST
SAN CARLOS, CALIFORNIA

LOS ANGELES PORTLAND SEATTLE
DENVER HONOLULU, T H. SALT LAKE CITY

Engineering Offices and Sales Agencies in Principal Western Cities

FOUNDRY SHAKEOUT conveyor system

HOWELL FOUNDRY of Los Nietos, Calif., has installed a shakeout conveyor system in its operations to separate castings from sand. Two natural frequency vibrating conveyors running for a distance of 90 ft. along the pouring floor are loaded within minutes after a pour along their entire length.

Castings and sand move along the conveyor trough, the impact of vibration separating the sand from the castings. A vibrating grizzly of parallel angles attached to the end of the second conveyor allows the sand to fall into a hopper.

A cross angle on the grizzly gives the castings a final jolt to break loose any remaining sand. Molds emptied onto the conveyor are as large as 22 x 24 x 18 in., and castings may weigh up to 100 lb. Since the conveyors are loaded immediately after a pour, castings reach the trough red hot. However, this heat is rapidly dissipated and the conveyor trough never reaches a temperature uncomfortable to the touch.

Both of the 45-ft. long conveyor units are equipped with 5-hp. motor drives. The troughs are 6 in. deep with widths of 28 and 30 in. The units vibrate at the natural frequency of the supporting coil springs and require low drive horsepower due to the regenerative action of the springs. Sand and castings are moved at a speed of about 85 ft. per minute.

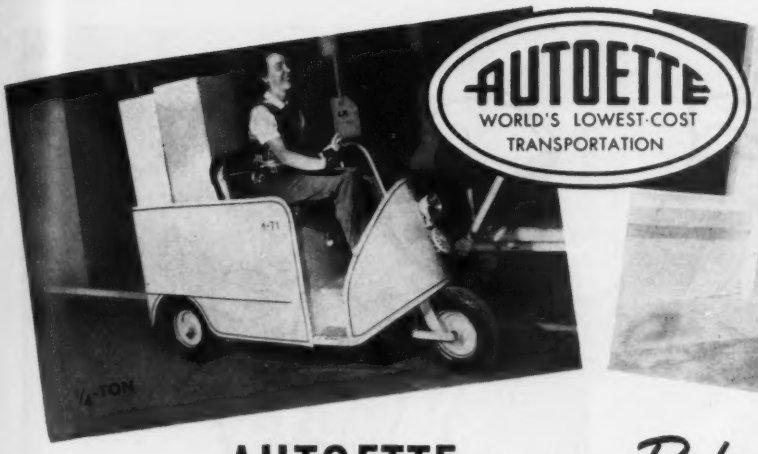
ALUMINUM CASTING unit imported

A NEWLY developed continuous aluminum casting and rolling unit, imported from Italy, is currently being installed in Aluminum Company of America's Vancouver plant.

Manufactured in Milan, the machine will be used for experimental casting purposes. The idea of the continuous unit is this: Aluminum ingot or scrap is melted in furnaces, the molten metal poured into the unit and aluminum rod emerges.

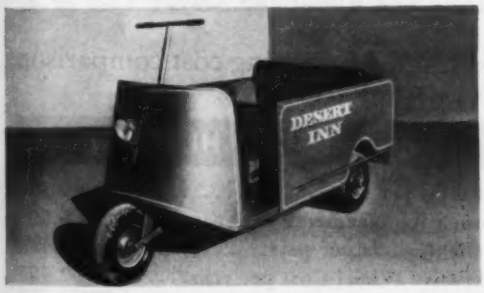
Molten metal is first poured into a wedge-shaped groove cut in a revolving water-cooled wheel. A continuous steel band forms the third side. The bottom of the wheel runs through a water tank, further cooling the metal, and the aluminum bar is peeled off the wheel as it completes the revolution.

The bar then runs through an attached rolling unit which forms the redraw rod, ready for further fabrication into wire products. The Alcoa unit is one of seven in the United States.



AUTOETTE Electric *Pickup Trucks* CUT your LIGHT-HAULING COSTS to...

VAN CAMP SEA FOOD CO. employs this ¼-ton AUTOETTE Pickup Truck for transporting watchmen, over a 2-mile circuit in its cannery at Terminal Island, California.



DESERT INN—one of the show places at Las Vegas, Nevada—keeps a number of Special ¼-ton AUTOETTE Pickups busy...transporting luggage to hotel rooms...maintaining room service...and doing many other useful chores.

⅕ cent per TON-MILE!

AUTOETTE Electric Pickup Trucks are famous for their amazing economy. Only 3 cents for electricity for 12 hours of daily hauling...30 miles of travel. That's less than a dollar a month—$10.00 a year—*1/5 cent per ton-mile!*

IDEAL FOR LIGHT HAULING

AUTOETTE Pickup Trucks are perfect for all types of light hauling...in industrial plants...docks and warehouses...resort hotels...movie lots...golf courses...estates and ranches.

RUGGEDLY BUILT FOR LONG LIFE

Both the ¼-ton and ½-ton AUTOETTE Pickups are expertly designed and ruggedly built to give years of dependable, trouble-free service. Because there's no engine or complicated parts, the AUTOETTE is free from costly repairs and adjustments.

For complete information and colorful AUTOETTE brochure, sign and return the coupon below.

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Please send information about Pickup Trucks

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Autoette Sales & Service, Los Angeles, Calif.
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Western Autoette Sales, Salt Lake City, Utah
Rapid Sales Corporation, Maywood, Ill.
Guelich & Boebel, Inc., Buffalo, N. Y.
B. F. Shearer Company, Seattle, Wash.
Brayley & Graham, Portland, Oregon
Gill Ride Company, Spokane, Wash.
Van Arsdale-Harris Lumber Co., San Francisco, Calif.
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1. Get CARMET carbide metal dies and equip your presses with them.
2. Make 1,000,000 small stampings a day with only *one* grind per day.
3. Save $56,907 annually by using Carmet, as shown in the following cost comparison:

WITH CARMET		WITH HI-CARBON, HI-CHROME	
★ 4½ Dies per year	$30,600	★ 22 Dies per year	$ 46,750
★ Punch Replacements per year	$(none)	★ Punch Replacements per year	$ 6,600
★ 260 Grinds per year	$14,560	★ 4,420 Grinds per year	$ 47,424
★ Diamond Wheel Cost per year	$ 792	★ Abrasive Wheel Cost per year	$ 2,085
ANNUAL COST WITH CARBIDE	$45,952	ANNUAL COST WITH FERROUS	$102,859

4. Make millions *more* precision pieces a year than you could with hi-carbon, hi-chrome dies!

Ask the Carmet representative to figure out the potential savings and increased production for you in terms of your own work. • *Allegheny Ludlum Steel Corporation, West Coast Offices: 5333 E. Slauson Avenue, Los Angeles 22, Calif.; 36 Berry Street, San Francisco 7, Calif.; 1927 First Avenue, South, Seattle 4, Wash.*

For complete **MODERN** Tooling, call

Allegheny Ludlum

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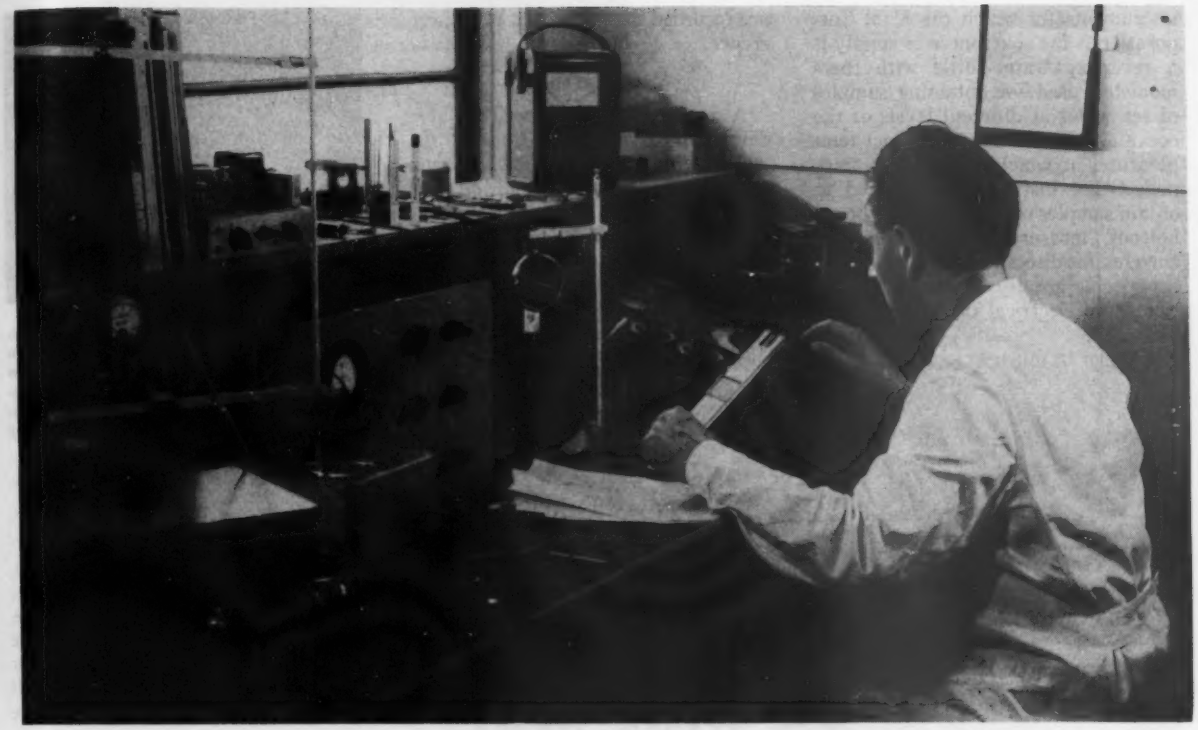
FINE TOOL STEELS
SINCE 1854



SECTION of electronics development laboratory. Physicist is making initial measurements on conductivity cell.

TEUTONIC TECHNOLOGY and TECHNICIANS TRANSPLANTED

Result is a scientific glass instrumentation industry for the West

AN ALMOST unnoticed gap in the Western industrial economy has been that of glass instrumentation required for oceanographic and meteorological studies, and for electronic research and nuclear physics laboratories for industry and universities.

A step toward filling it has been the postwar importation of several outstanding technicians and scientists from German industry and research laboratories to the little town of El Cajon, in the foothills back of San Diego. Here the only plant of its kind west of Chicago in connection with thermometry has been set up.

The establishment is that of the Kahl Scientific Instrument Corporation, organized in 1948. Joseph Kahl, its founder, had been furnishing the government with certain oceanographic instruments which heretofore had been obtained solely in Germany. He had been producing them in a New York City plant, but production stopped when the sole technician able to make such instruments passed away.

Trip to Germany

Through the endorsement of the Office of Naval Research and the help of Dr. Roger H. Revelle, Director of the Scripps Institute of Oceanography at La Jolla, Calif., he was permitted to visit Germany in 1947 to select key men for the nucleus of another oceanographic instrumentation organization.

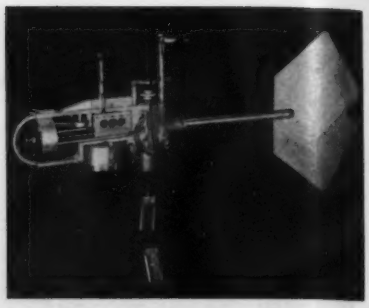
This trip was on Mr. Kahl's own time and money. He decided that California would be the most logical place and selected San Diego because it was a center of oceanographic research in the Pacific area. The physicist and several of the technical glassblowers whom he brought back had spent most of their lives working on research problems in the fields of electronics and high vacuum in such laboratories as the Kaiser-Wilhelm Institute, Deutsche Poste and Siemens-Halske. They brought with them specialized training and abilities which are hard to duplicate, and the establishment of the plant at El Cajon makes the United States independent of any foreign supplier. In fact, Kahl now supplies other foreign laboratories and governments.

One of the primary oceanographic

instruments for which the Kahl Corporation is the sole source of supply is a reversing water-bottle with thermometer, used for obtaining samples of sea water at different levels of the ocean and ascertaining the exact temperatures at which the water is trapped. Other instruments are used to obtain samples or cores from the ocean bottom, measurements of undersea currents for direction and velocity and for specific gravity or salinity of seawater. An electrical thermometer has been developed to measure temperatures from 16 different locations which are recorded on a chart for future reference.

Mercurial special

A special eutectic mercury has been developed in the Kahl Laboratories which will withstand freezing temperatures as low as —80 deg. F. Mercury ordinarily freezes at —34 deg. F., and the common automobile uses mercury switches but they will not operate at low temperatures. For temperature measurements lower than —36 deg. F., it has always been necessary, until this time to make use of liquid-filled thermometers.



CURRENT METER, sent down into ocean, indicates subsurface current velocities on dial and direction of current in compass box underneath dial. This is accomplished by balls which fall into numbered partitions of compass box as propeller rotates.

One primary application of this mercury is for military instrumentation, such as actuating mercury switches, relays, temperature instruments, gyros, etc., where components must meet the regular cold test requirements under Army-Navy specifications. In aircraft instrumentation cold temperatures are commonplace.

Another application is to replace mechanical switches for automatically starting and stopping circuits. One of the problems in mercury contact switches is to design them so that they will stand up for long periods of time without cracking or breaking. One solution has been to pot switches, and the potting compound of special plastic absorbs shock waves and also minimizes danger of breakage due to impact shock. A special protective device at the small evacuating tip has been found to prevent the tip being cracked by the impact of the mercury.

Tungsten electrodes

Tungsten electrodes for high amperage work have been devised for time delay switches, which are made with single or multiple contacts. A hermetically sealed electro-magnetic switch with pendulum type contacts which are electrically actuated to come in contact with mercury reservoirs and make contact has been developed for special electronic circuitry. It is designed to operate effectively when needed, even if inactive over a period of years. It is not influenced by time, weather or temperature changes.

Precision level vials were recently furnished for rocket launchers to one of the government departments that had been trying unsuccessfully to obtain them elsewhere. Level vials are used for artillery gun carriages, instruments of all types, as well as the ordinary carpentry and machine shop

According to our customers, they continue buying Ledeen Cylinders because, "You people knock yourselves out to give us good service, and your cylinders perform better and last longer."

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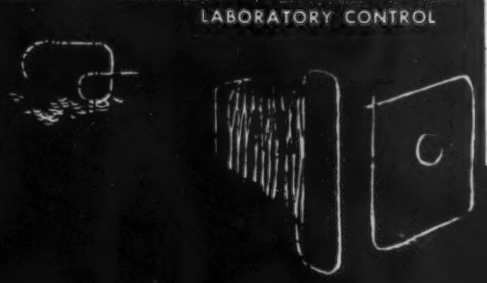


Here's what

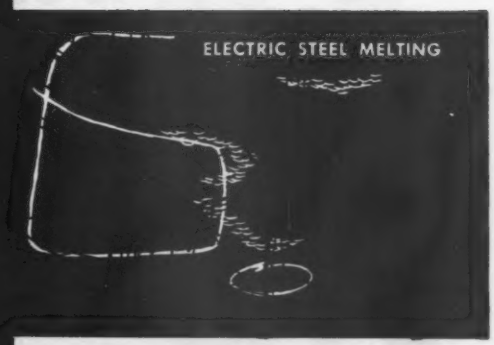
can do for you in its "Workshop of the West"

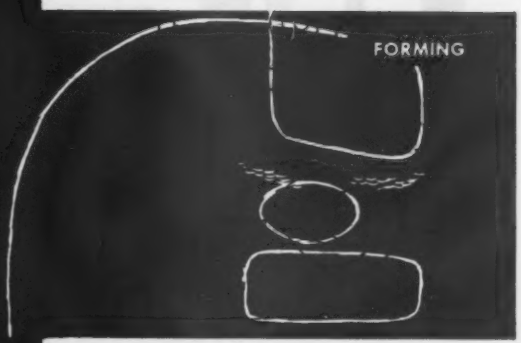
At National Supply's Industrial Products Division in Torrance, fully integrated facilities are available to completely process your steel product—or any part of it.

If you need special or standard machinery parts, for example, you'll find it worthwhile to send the jobs to National, where a staff of skilled operators and technicians will produce them to your most exacting needs.

You'll find that big jobs requiring precision work are typical of daily operations at Torrance, where the most complete facilities serve every type of industry in the western states—steel, shipbuilding, aircraft, transportation, mining, and many others.

Why not let National solve the problems on your next tough job?





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Ideal Pressed Steel Forgings • Billets and Large Bars
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Materials Handling

We don't just sell materials handling equipment. We go 'way beyond that. Before we sell anything . . . before you buy anything from us . . . we want to be certain that you are going to get exactly the type of equipment that will best meet the requirements of your handling job . . . and in the size that will be most efficient and economical.

So . . . with your permission we take a look . . . make a detailed study of your operations. Then . . . and only then . . . we feel qualified to make some realistic recommendations. And you may be sure that what we suggest will be based upon sound and thorough experience in solving materials handling problems for a great many different types of businesses.

If the situation calls for fork lift trucks, powered hand trucks or industrial towing tractors, you'll be in good hands. For we sell the Clark line . . . better engineered and better built to do a better job.

And, of course, we maintain completely equipped service departments . . . stocked with genuine Clark replacement parts . . . and manned by factory trained service men capable of handling even the most baffling repair or overhaul job.

Through years of service in the West, we are close to the problems of western industry. So look over the list of Clark dealers below and call the one nearest you.

CLARK MATERIALS HANDLING EQUIPMENT

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Fresno, San Diego, Bakersfield • Phoenix, Arizona

GLEN L. CODMAN COMPANY, INC. • Oakland 3, California

PRESTON FALLER COMPANY • Seattle and Spokane, Washington

tools. Developments are now well toward completion on a basically new type of level vial which will electronically indicate positioning to tolerances heretofore believed impossible in this type of device.

Bonding copper plating to tungsten is a development which enables the user to solder electrical leads directly to the tungsten electrode or wire, instead of connecting leads to tungsten by a swaged joint or butt-welding.

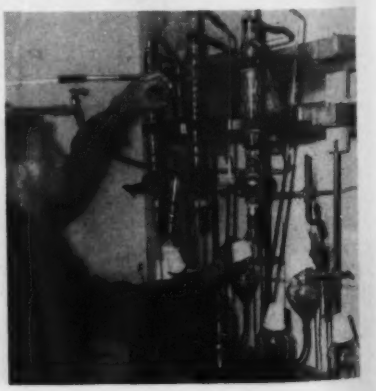
In the field of eletronics, the first major development by the Kahl Corporation was a moisture tester, developed for a San Diego firm that had a Navy contract for bottled oxygen for aircraft use. The contractor had no means for measuring the moisture content of his bottled oxygen, an important matter for Navy flyers, since if too much moisture is contained in an oxygen bottle, it will freeze up and not permit the oxygen to flow through the nozzle.

Another one

Another type of electrical moisture tester was developed for accurately measuring relative humidity in ducts, wind tunnels, cooling towers and other places where a technician cannot stand. This is an electrical instrument with miniature sensing elements for obtaining wet and dry bulb measurements on a pair of meters. Measurements can be made from distances up to 200 ft. A companion instrument is an anemometer for measuring wind flows by means of a vane which magnetically transmits the count to a magnetic counter.

The Kahlsico organization is now working on two developments of importance to radar and medicine. One is the final completion of the design of a microwave calorimeter for measuring the output energy of radar sets, the other an electrical thermometer for medical research.

COMPLICATED distillation apparatus used for purifying mercury in its final stages of cleansing.



CYCLO-MONITORS®

CIRCUIT CONTROLLING PRE-SET COUNTERS with *Instantaneous Automatic Reset*

WHAT CYCLO-MONITORS DO:

1. Count *revolutions, strokes* or *electric impulses* (standard models available for each type of operation).
2. Transfer the switch when a pre-set count is reached.
3. Hold the switch in the transferred position for a pre-determined count—momentary or dwell—without interruption of the counting process.
4. Return the switch to its normal position.
5. Repeat this cycle continuously, without re-setting or checking.

The Cyclo-Monitor determines not only *when* the switch will transfer, but also *how long* the switch will remain in the transferred position. Any Cyclo-Monitor can close an open circuit, open a closed circuit, or simultaneously close one circuit and open another when the desired count is registered.

RESETS INSTANTLY ON COMPLETED COUNT

All motion at the drive shaft is registered in the count. The patented reset operates with absolutely no time lag, pause or lost motion—regardless of speed—for either continuous or intermittent operation.

WHERE CYCLO-MONITORS ARE USED:

Automatic Reversing	Marking Lots	Shear Control
Batch Counting	Measuring and Cut-Off	Sheet Counting
Box-Making Machinery	Metering Control	Signal Control
Coil and Armature Winding	Motor Control	Slide Fastener Gap Spacing
Container Filling	Packaging Machinery	Slip Sheeting
Depth Control for Drilling and Tapping	Paper Converting Machines	Solenoid Control
Instrumentation	Printing Machinery	Speed Control
Intermittent Conveyor Control	Punch Press Cut-Off	Spooling
Life Cycle Testing	Relay Control	Spring Forming
	Resistor Winding	Textile Machinery
	Roll Sizing	Timing

and All Kinds of Production Machinery Operating on a Repeating Pre-Selected Count

Cyclo-Monitors are more than counting devices. They are electric circuit controls that operate on a predetermined count which will repeat automatically. Adjustment for a desired count is made easily and quickly.

After the desired setting has been made, the automatic reset feature allows the operator complete freedom from count worries. There is nothing to watch during the run. There are no interruptions between cycles for count reading, checking or manual reset operations. The electric circuit takes over and produces the desired results with the count "built-in" to the operation. The functions of motors, relays, solenoids, signals, etc., can be accurately and automatically governed by means of these time-saving controls.

Through Cyclo-Monitors, many machines and processes can be greatly simplified by the elimination of change gears, complicated cam systems, awkward mechanical stops, intricate control circuits and the like. Moreover, set-up time for any desired cycle sequence can be reduced to a very desirable minimum.

WRITE NOW FOR BULLETIN 202A

COUNTER and CONTROL CORPORATION

5225 W. ELECTRIC AVE. • MILWAUKEE 14, WIS.

—STEAM PUMP MAINTENANCE TIPS—

By PAUL L. ARMSTRONG
Union Steam Pump Sales Co.
Los Angeles

A COMMON problem of steam pump users is the proper operation of spare pumps. There does not seem to be any unanimity of opinion as to the best method of doing this. Depending on the size of plant, we find three methods of sparing pumps.

1. *The pumps are spared by a duplicate pump,* both as to size and type of drive, making it comparatively easy to change from an operating to a spare pump.

2. *We have an identical pump, but the method of drive is different.* For example, a motor-driven or gas engine-driven centrifugal pump may be spared by a turbine-driven pump of the same size, or with a direct-acting steam pump. This presents more of a problem than just switching the suction and discharge valves.

3. *We have pumps with a common spare.* That is, we have one or more services and the pumps are usually not the same size. Here again special problems are frequently presented. It may be necessary to put the pump on hand control, rather than automatic control.

It is a well known fact that it is much more difficult to maintain a spare pump than an operating pump. It is harder to hold the packing on the spare pump which must be loose enough to not burn when operating, and yet tight enough not to leak when idle. We recommend that a good deal of consideration be given to this problem, to obtain the best over-all results.

Maintenance of spares

Speaking of steam pumps in particular, many operators make the following suggestions in regard to the spare pump:

1. Drains in the steam end be opened and allowed to remain open until the pump is again operating.

2. The steam end rod should be out of the box when shut down, and the exposed portion of both rods be coated with a rust-preventing grease.

3. Reciprocating pumps, if allowed to stand idle for any great length of time, should be "barred over" to prevent the piston rings from rusting in place.

4. Reciprocating pump rods should be freed from dust and rust before starting, otherwise a scored rod is apt to result when it is put back in service.

When we think of maintenance of pumps we find the subject divides into natural groups of operations.

Packing

What makes packing a pump so important is that each and every stuffing box is a separate, distinct, personalized job! The time and materials required to pack a pump is an item of expense, but failure of a stuffing box may lead to a serious and expensive repair job, such as failure of bearings by contamination of lubricant, and internal damages to the pump caused by failure of the bearing.

Spare packing

One of the debatable questions is how to handle and store spare packing. Spare packing must be available when required. It is far better to waste a

New Plant for Angelus Steel Treating Co. — of Steel and Concrete Construction.

Going to Build?
Call EMPIRE

FLEXIBLE DESIGN
Empire rigid steel frames are easily combined with masonry, tilt-up concrete walls, composition roofs, etc. Any width, any height, any length.

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Empire will assist in arranging the financing of an Empire building for your convenience. Free estimates — no obligation.

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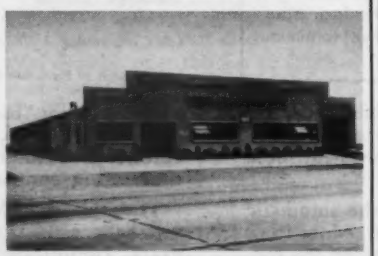
= LOW COST
Custom Buildings at Standard Prices

Second Plant Built for Coca-Cola Bottling Co. — of Steel and Concrete Construction.


New Plant for Powers Mfg. Co. — of Steel and Concrete Tilt-up Construction.

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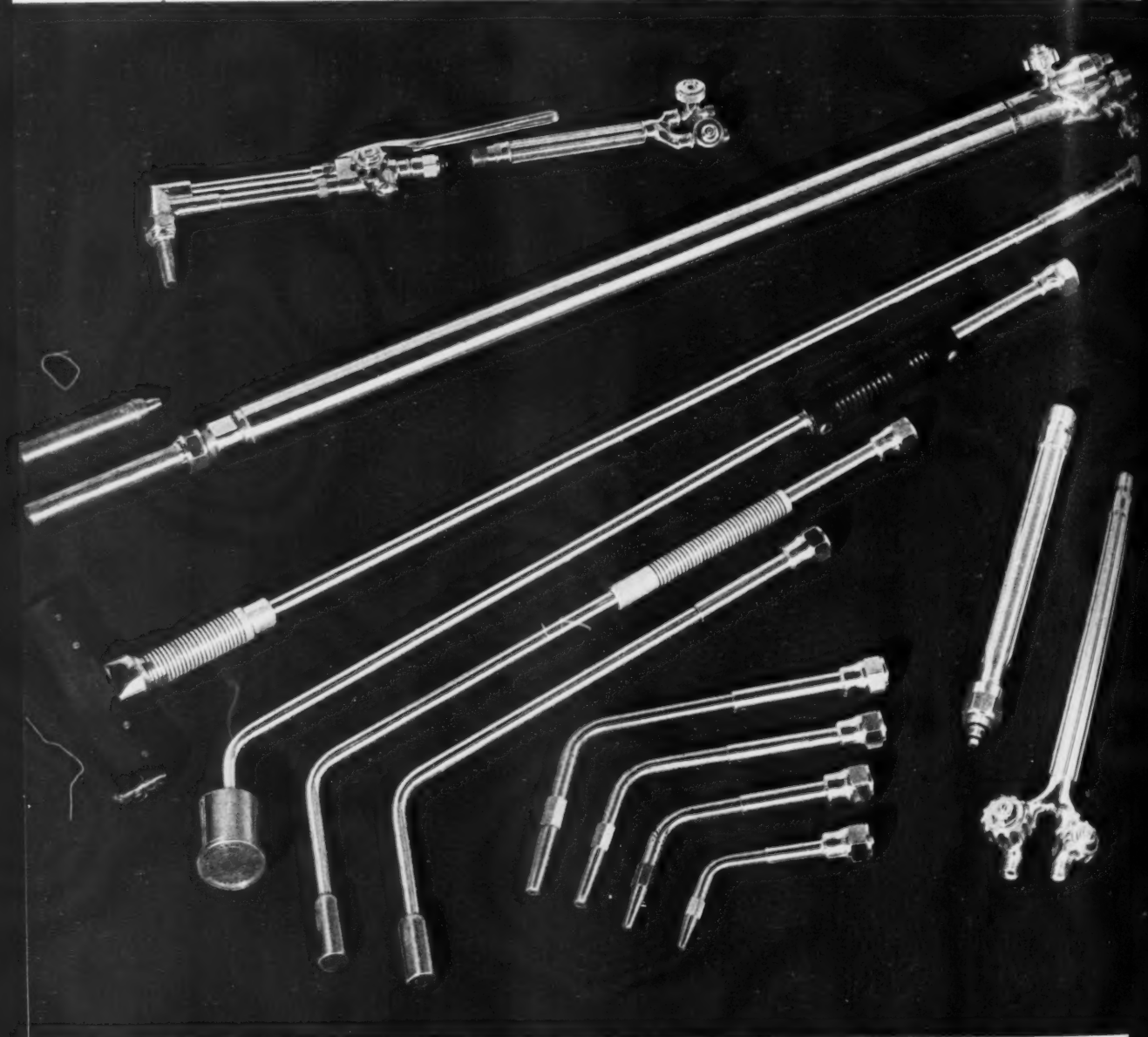
REGULATORS
For accurate and dependable pressure control

VICTOR Welding and Cutting Apparatus

precision-built for lasting service



TOP TO BOTTOM: *VICTOR 100 series welding torch butt and C 1450-100 cutting attachment. 4000 series machine cutting torch. Stainless steel model 362 descaling attachment and preheating nozzles stay cool longer. Type 3 welding nozzles and 320 torch extension for 300 series welding torch butts (lower right). No wrench needed to change attachments.*

IT PAYS TO STANDARDIZE ON VICTOR Complete selection enables you to get exactly what you need for cutting, welding, scarfing, descaling, hard surfacing and other jobs. Every item precision-built to perform safely, dependably, economically. Your VICTOR dealer will gladly show you why it costs less to own and operate VICTOR!

VICTOR for welding

VICTOR EQUIPMENT COMPANY

Mfrs. of welding & cutting equipment; hardfacing rods; blasting nozzles.

3821 Santa Fe Ave. LOS ANGELES 58

844 Folsom Street SAN FRANCISCO 7

1312 W. Lake St. CHICAGO 7

few dollars worth of packing than to risk a dangerous fire, or a shut down, due to using some impromptu packing because the required size or type was not on hand.

Only a few companies continue the early practice of buying packing by the yard and having each mechanic cut the packing to fit in the field. This may seem economical, but in actual practice it is most wasteful, if for no other reason than it requires skill and time just when the mechanic is under the strain of getting a pump back on stream.

Two methods suggest themselves. One is to have the packing made up in sets by the manufacturer with the size and type shown on the original package. Usually the packing manufacturer provides in the set an extra ring for later use in "taking up the box."

Second, pre-form the packing in your own shop, or warehouse. Where you have a number of pumps with the same size stuffing boxes it may be profitable to own your own dies for forming the packing.

Lubricate packing

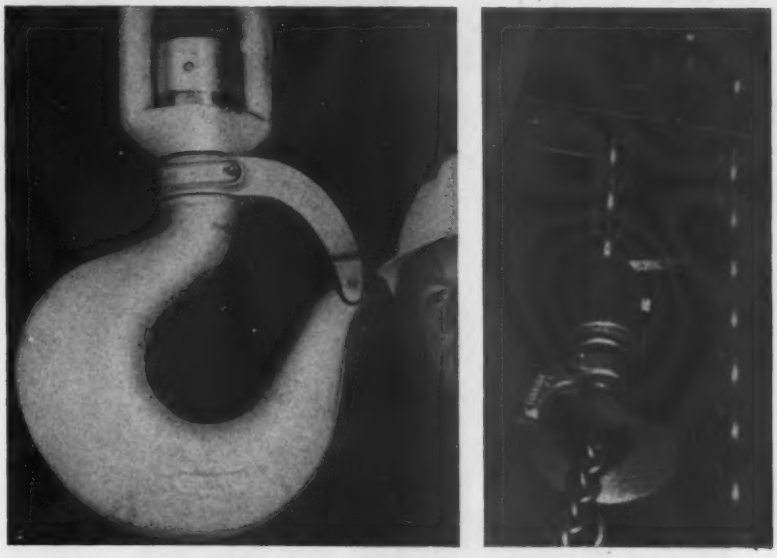
In packing a pump it is usually desirable to lubricate the packing. But only the rubbing face should be greased or graphitized. The reason is that the natural lubricant in the packing, together with excess grease used in installing the packing, will expand due to friction, and heating will occur resulting in a "hot" stuffing box.

It is important to remember there is no universal packing. Hemp packing used for a caustic wash pump will cut a bronze shaft or sleeve used on a water pump. Many packings suitable for water service will disintegrate, or swell, when used for oil service, and aluminum foil packing used for heat medium pumps are too expensive and more highly frictional than the proper packing for other services. Furthermore, when aluminum foil packings are used, it will be found economical to use stellited or colmonoy coated shaft sleeves or pump rods in this service.

Watch interior condition

It is important to watch the condition of the interior of the pump stuffing boxes, particularly on old pumps. They have a tendency to wear unevenly, or even to distort. It is next to impossible to keep such a pump packed. Such a box should be trued up, sleeved, or a new "head" ordered, depending on the economies and size of the pump. When examining the box, also examine the gland for "sloppy fit." Worn or bent studs should be replaced. In centrif-

PROTECTION – WHERE ACCIDENTS BEGIN



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At last a 100% safe hook for every type of equipment; utility and chain hoists, horizontal tuggers, come-a-longs, cranes, block and tackle or snatch blocks. Safety gate automatically locks closed and cannot be disengaged accidentally. A touch of the finger releases the lock to open gate. If the hook is sprung, even ¼ inch, gate will swing free, warning workers. All hooks used are standard drop forged hooks with B & B safety gates of non-corrosive brass. Sizes available #2 through #16A. Return spring on gate is available at additional cost. Write for descriptive circular.

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Richfield Eagle Oil R&O is made from selected 100 per cent Mid-Continent paraffin base stocks. All viscosity grades are compounded with the same oxidation inhibitor to give you the most stable industrial oil.

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EAGLE OIL R&O

ugal pumps the bearing clearances should also be checked by using a pinch bar under the shaft. It is also advisable to check the sleeve with a dial indicator, and make sure it is running true.

You cannot make a seal work on a poor pump, or a pump which has too much play. If it is necessary to handle packing with care, it is even more important to be careful when working with a seal. The seal faces must be clean, free from any grit or scratches. When you have occasion to work on a pump equipped with seals—say replacing the bearing—it is often desirable to replace the faces on the seals, for this reason: If the seal faces have "opened up," they may or may not "match faces" when they go back together.

Wearing rings in centrifugal pumps

Most heavy duty pumps as found in the gasoline plant are fitted with case rings, and in most instances the impellers are fitted with impeller rings. The purpose of these rings is to provide good wearing surfaces between the stationary and rotating parts of the pump. On one side of the ring we have approximate discharge pressure, and on the other side suction pressure. It is desirable to keep clearances between the rings as low as possible to limit leakage from the discharge side back to the suction side.

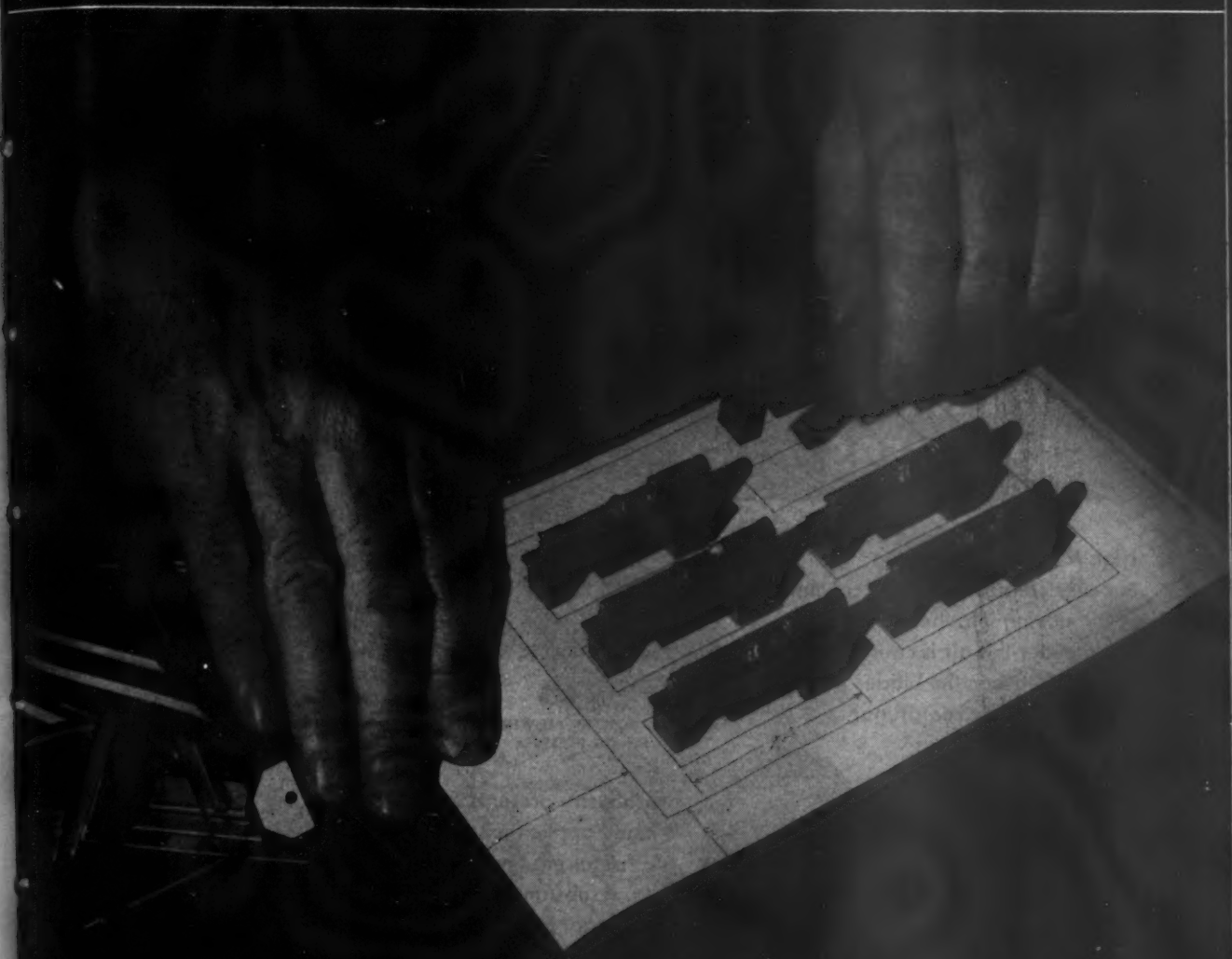
The use of rings protects, and at the same time simplifies replacement of these wearing parts. They also enable the pump manufacturer to use hardened surfaces for wearing parts, which would not otherwise be feasible. In this connection the rings should be of a different hardness by at least fifty Brinell, or of different metals to prevent galling in the event of a light contact between these parts.

The case and impeller rings are the first place to show signs of piping strain on a pump casing. Piping strains distort the pump casing, causing the rings to wear unevenly. This may be the place to bring to your attention the necessity of keeping the weight of the piping off the pump. A few of the better, heavy duty, modern process pumps are designed to resist piping strains, but in general the pipe should be supported by anchors or pipe supports to relieve strain on the pump casing.

Direct-acting steam pumps

Direct-acting steam pumps are made in two types. One, the duplex, is used for boiler feed service and general utility work such as lube oil and water transfer, skim ponds, etc. The other, the simplex, is usually of the close

WHY IT PAYS TO BUY STEEL FROM WAREHOUSE



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WHEN YOU BUY STEEL FROM WAREHOUSE, YOU GET:

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- FASTER PRODUCTION
- FEWER INVENTORY LOSSES

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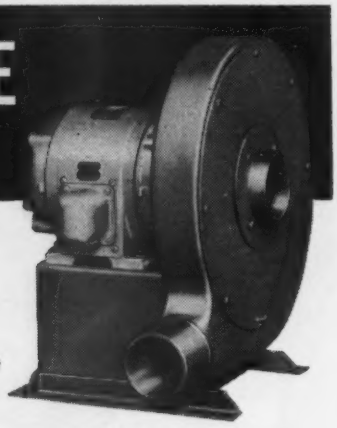
UNITED STATES STEEL

clearance pattern for handling light hydrocarbons.

Maintenance-wise, both pumps present the same problems. The steam end requires very little attention. The piston rings and slide valves last for many years if properly lubricated. The steam valve gear should receive more attention. Sloppy valve gears mean you cannot run the pump to the end of its stroke and therefore the pump is wasteful of steam, or if it does run to the end of its stroke, it is apt to overstroke, causing damage to the liquid end piston rings. When a pump has a leaking valve it is quickly detected. You can estimate the condition of the liquid end piston rings by pinching the discharge valve to see whether the pump "slips." If it does slip or slide quickly from end to end, it indicates leakage past the rings. The rings in a close clearance pump, because they handle a non-lubricating fluid, are the ones most subject to wear.

From time to time open up these close clearance pumps and check the liner, and also the thickness of the ring. If it is too thin, take it out and replace it. The ring failure in itself would not be serious. The difficulty is that the expander is liable to jump the groove and gouge the liner, which is then a very expensive repair job. A record kept of the life of the rings will indicate when inspections should be made, and we think the extra trouble and clerical work involved is justifiable.

HIGH PRESSURE BLOWERS

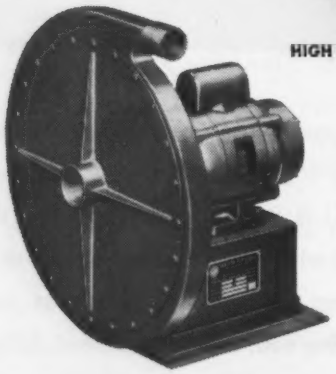


MEDIUM DUTY HP BLOWER TO ½ POUND PRESSURE

High rotative speed of the impeller creates a rotating column of air moving into the inlet. In the impeller this air is caused to move radially between the blades to the periphery by centrifugal force. The energy thus imparted is converted into pressure at the discharge opening sufficient to overcome the resistance set up to the flow by the equipment or apparatus attached.

HIGH PRESSURE IMPELLER

Industry presents many applications requiring air at substantially constant pressure but variable volume for varying conditions. Typical would be supply of air for combustion to an oil burner, supply of air or gas to a gas burner in a furnace or industrial oven. Maximum air delivery is required only for full load. However, under all other conditions the pressure must be maintained while the volume is reduced. Master Type HP Blowers will be found ideally suited for this and similar applications.



HIGH DUTY HP BLOWER TO 2 POUNDS PRESSURE

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POWER DISTRIBUTION goes modern

BENICIA ARSENAL has recently installed one of the most modern power distribution systems used by the United States Army.

To keep up with load requirements, the Arsenal went from a single phase, open-conductor, low voltage type distribution (total load 3,000 kva.) to a modern, three phase, metal-enclosed system (total capacity 9,750 kva.). It consists of three General Electric substations.

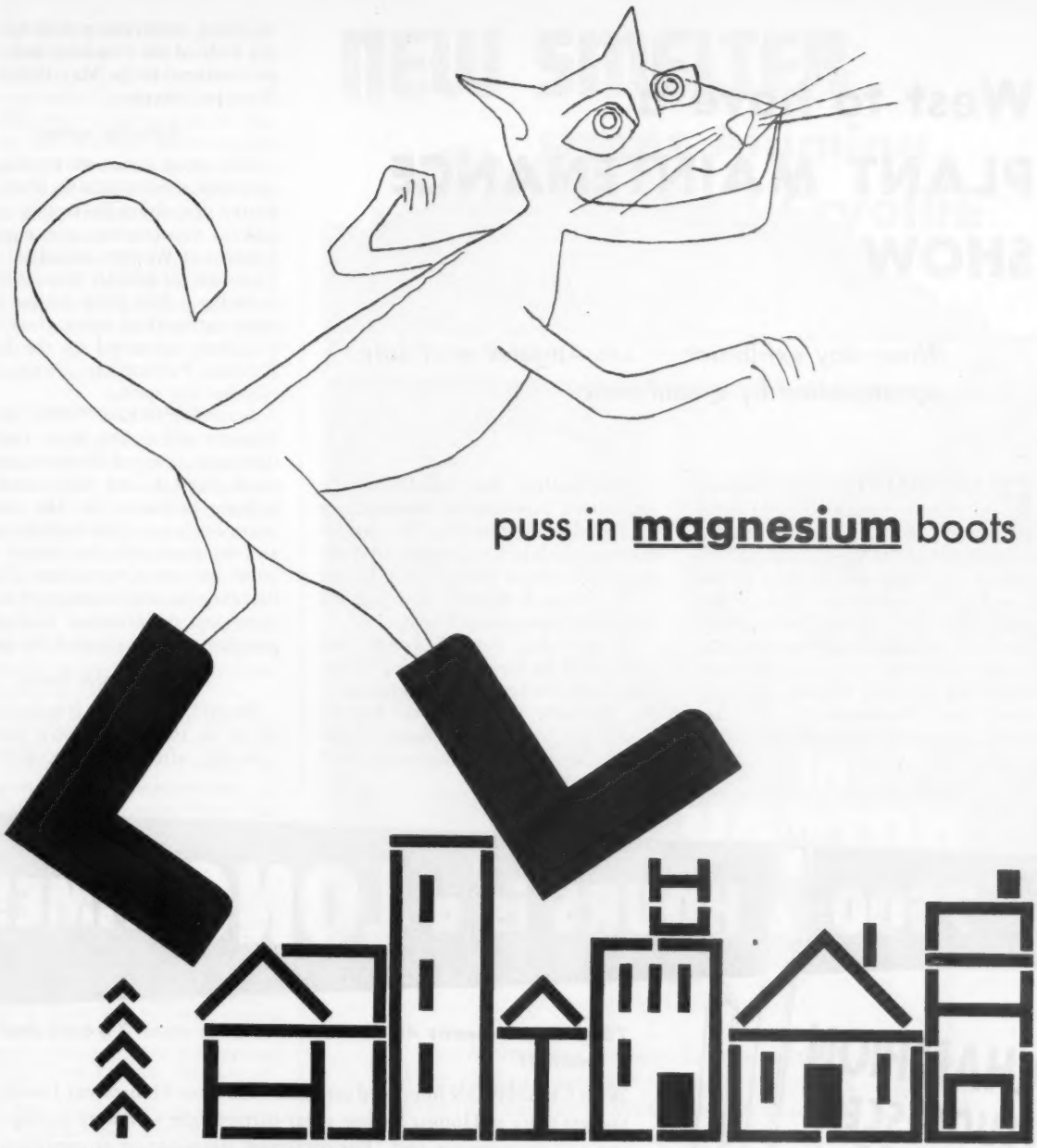
The largest substation includes two three-phase 3,000-kva. transformers which transform 22.4 kv. incoming power to 2.4 kv. The high voltage power is carried underground to the transformers by cable from a switching point on the edge of the Arsenal property. The low voltage current from the transformers is carried by bus, through the bus duct, into a building housing the metal-clad switchgear.

MATERIAL HANDLING chapter forming

PRELIMINARY steps toward formation of a Northern California chapter of the American Material Handling Society were taken at a luncheon meeting in San Francisco, Nov. 9.

Maurice C. Jones, materiel supervisor, shipbuilding division, Bethlehem Pacific Coast Steel Corporation, acted as temporary chairman. A temporary steering committee, to prepare for the next meeting was chosen.

Chairman: Thomas A. Fante, supervisor, merchandise and stations, Southern Pacific Company; Maurice Jones, Bethlehem; Ellis Woolley, training supervisor, Naval Supply Depot, Oakland; W. R. Postlewaite, mechanical engineer, Standard Oil Company; Leslie Herman, Baxter Warehouse division, Safeway Stores; S. E. Perkins, sales engineer, Mailler Searles, Inc.; Roderick V. Pierce, *Western Industry;* Ray Perin, manager, Ira G. Perin Company.



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West to have a PLANT MAINTENANCE SHOW

Three-day exhibition in Los Angeles next July, accompanied by a conference

PLANT MAINTENANCE shows, which have been highly successful in large Eastern cities, are to have a counterpart in the West, as an exhibition of this kind will be held at the Pan Pacific Auditorium in Los Angeles July 13-15, 1954. Concurrently there will be a plant maintenance conference, directed by L. C. Morrow, consulting editor of *Factory Management and Maintenance*, who has headed up similar conferences in other places.

This Western show will feature the specialized problems of maintenance and engineering faced by Western industry, which has undergone such expansion in recent years. It will be put on by Clapp & Poliak, Inc., national exposition management firm.

A somewhat related event next spring will be the Institute on Industrial Plant Design, to be conducted at the Biltmore Hotel in Los Angeles March 2-3, by the Los Angeles Chamber of Commerce. The first institute of this kind, which was put on by Franklyn Cole of the Chamber last March, was featured in the May 1953 issue of *Western Industry*.

Editorial action

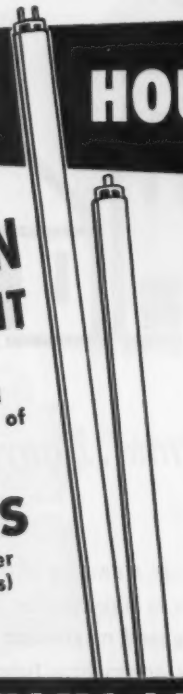
The above events were preceded by an editorial campaign in *Western Industry* describing interesting and significant construction and equipment features of Western industrial plants. This series of ariticles won for *Western Industry* a first prize plaque for the most outstanding series of articles in a contest sponsored by the Western Business Publications Society in Los Angeles last spring.

According to Saul Poliak, the firm's Western office has been making a thorough survey of Western industrial plant methods and specialized maintenance problems for the past two years. So many of the facilities are new and designed with the benefit of the latest and most up-to-date planning, that they are able to employ both operating and maintenance methods not practical in older parts of the country.

West a major factor

He said, "The West is today a major factor in the the nation's industrial economy, after an unprecedented ex-

7500 HOURS is a LONG TIME!



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pansion within a few short years. It has developed its own methods to suit its geography and environment, with their accompanying specialized problems. Efficiency of every type is foremost in the Western industrialist's mind, as he strives to compete in eastern markets with their local producers.

"This has created the need for a plant maintenance show and its concurrent conference on improved procedures focused entirely on the Western problems, which he can attend confident that his time will be occupied with matters having to do specifically with his own business.

Expensive proposition

"From a frequently held concept that maintenance was primarily an oiling and mopping process, the science has grown until it is now recognized as an integral part of plant construction, layout, power and production. Few companies these days can afford to overlook the tremendous costs of maintenance and, as automatic processes continue to be developed, maintenance will become more and more the primary factor in cost reduction."

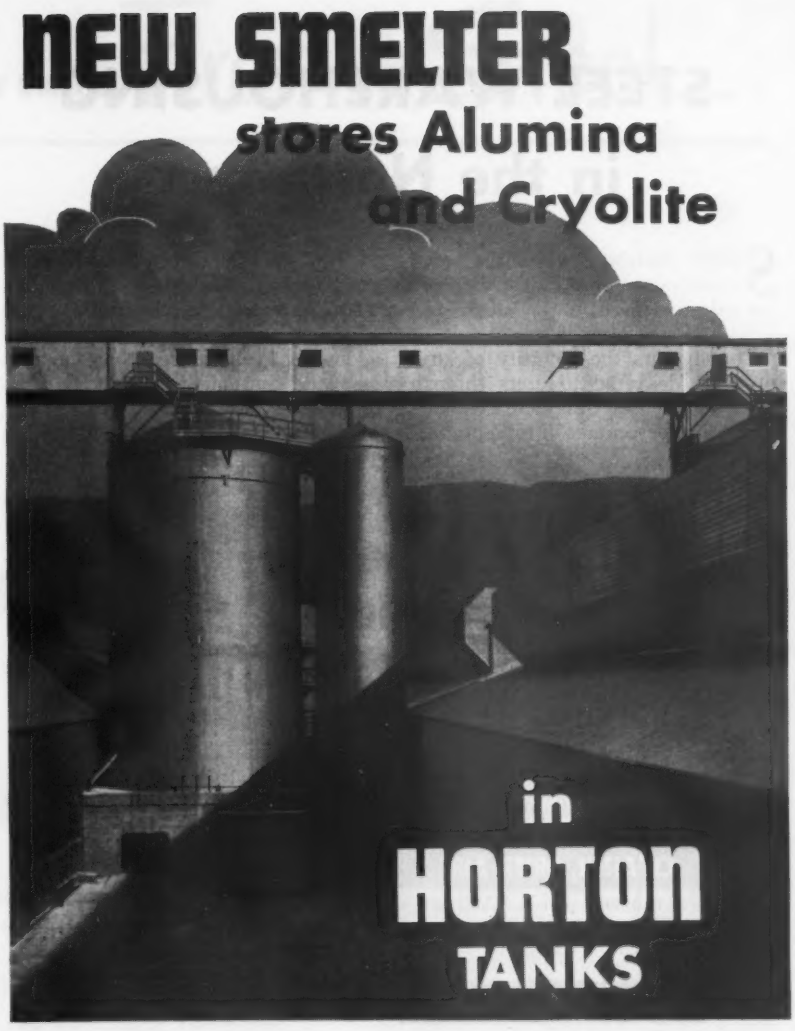
The Board of Sponsors for the show is composed of leaders in each of the major industries in these fields, including those whose headquarters are in the West, and eastern firms who conduct large activities in the West.

They are:

E. R. Barkley, Vice President, Sales, Beaver Pipe Tools, Inc., Warren, Ohio; William E. Belt, Sales Manager, The Protectoseal Company, Chicago, Illinois; E. W. Bullard, President, E. D. Bullard Company, San Francisco, Calif.; Fred A. Carpenter, President, Berkeley Pump Company, Berkeley, Calif.; E. R. Cluff, Vice President, General Paint Corporation, San Francisco, Calif.; F. C. Devine, Manager, Public Relations and Advertising, Turco Products, Inc., Los Angeles, Calif.

E. M. Ellis, Manager, Pacific Southwest District, Apparatus Sales Division, General Electric Company, Los Angeles, Calif.; Jack M. Evans, Sales Manager, C. A. Norgren Company, Englewood, Colorado; Orville C. Hognander, Vice President, G. H. Tennant Company, Minneapolis, Minn.; Jack Kiefus, President, Big Joe Manufacturing Company, Chicago, Ill.; F. A. Lewis, Plant Maintenance Engineer, Food Machinery & Chemical Corporation, San Jose, Calif.; F. J. Machovec, General Manager, Modern Manufacturing Company, Pasadena, Calif.

G. W. Malme, Public Relations Director, Western Gear Works, Los Angeles, Calif.; Paul C. Merrill, Vice President, Production, Los Angeles Soap Company, Los Angeles, Calif.; C. Glenn O'Donovan, Exhibit Manager, United States Hoffman Machinery Corp., New York, N. Y.; J. A. Ransford, Asst. Wholesale Sales Mgr., Tide Water Associated Oil Company, San Francisco, Calif.; R. A. Saling, Pacific Coast District Maintenance Supervisor, Westinghouse Electric Corporation, San Francisco, Calif.; and P. L. Symons, Vice President, Albina Engine & Machine Works, Inc., Portland, Oregon.



The Aluminum Company of America installed nine 38-ft. diam. by 64-ft. Horton* tanks for the storage of alumina at its new smelter at Wenatchee, Washington. Also eight 17-ft. diam. by 62½ ft. Horton tanks for the storage of cryolite. These structures are one example of the many types of steel plate structures we build for industrial service.

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Chicago 4.....2132 McCormick Building	Pittsburgh 19.....3267 Alcoa Building
Cleveland 15.....2256 Midland Building	San Francisco 4.....1578—200 Bush Street
Detroit 26.....1567 Lafayette Building	Seattle 1.....1369 Henry Building
Houston 2.....2164 C & I Life Building	Tulsa 3.....1667 Hunt Building

Plants in: BIRMINGHAM, CHICAGO, SALT LAKE CITY, and GREENVILLE, PA.

STEEL WAREHOUSING in the Northwest

STEEL warehouses are the retail stores of the steel industry. There are only two places to buy steel: steel mills and steel warehouses.

In 25 years the quantity of steel products delivered to users through steel warehouses has increased four times. The percentage of total production of steel shipped by mills to warehouses has doubled in this period. Today, warehouses distribute nearly 20% of total steel production, accounting for more steel than the largest steel consuming industry.

Average size warehouse order for industrial steels is about 1,200 lb. Two million orders for industrial steels are filled by warehouses each month.

Three categories

Warehouses fall into three general classes: (1) those supplying steel and pipe for drilling wells and transporting oil and gas; (2) the wholesale hardware and building supply companies that carry nails, fencing, roofing and water pipe; and (3) the industrial steel warehouses that stock the steels used to make buildings, equipment or any other product containing steel. Combined, these three types of warehouses sold about 14,000,000 tons of steel products in 1951. The 80 oil-country warehouses sold 2,000,000 tons; the 30,000 supply houses, 3,500,000 tons; and the industrial steel warehouses, 8,500,000 tons.

This 8,500,000 tons is broken down into 410,000 tons of alloy steels with nickel, chromium, molybdenum, and other alloying elements. Stainless steels, with their high content of nickel and chrome, accounted for 120,000 tons, while common carbon steels filled out the remaining 7,970,000 tons.

Portland tour

During a recent warehouse tour and meeting of the American Steel Warehouse Association in Portland, Oregon, it was pointed out that 90% of all steel consumers purchase all their requirements from steel warehouses. Even the largest steel users rely on warehouse stocks for emergency and maintenance supplies.

John E. Doxsey, assistant to the president of the organization, indicated that supply and demand for steel should be in balance by the end of 1953. Doxsey further stated, "Several factors suggest that the urgency of steel has passed. Steel mills are not operating at or above rated capacity for the first time in many months. Deliveries of most products are subject to less delay, deals for conversion steel have faded away, and premium mills are beginning to feel the pinch of competition."

Doxsey pointed out that steel distributors handle about 20% of the country's total field output, but that figure is even higher in the Portland area. Due to types of industries located in this area, it is estimated that at least 30% of the steel consumed is supplied by local warehouses.

The tour was designed to show two typical but widely differing types of steel warehouse. First visited was the Pacific Machinery Tool Co., Portland, serving all Pacific Northwest firms having machine shop facilities. This includes logging, lumber, plywood, pressed wood, pulp and paper mills

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Contaminants are removed automatically; only periodic inspection to make sure units are not accidentally damaged or fouled.

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Unit parts are non-rusting, resistant to all common industrial gasses and acids. Special units can be built for unusual conditions.

NO WASTED AIR *(check savings)*

Positive action blasts water and sludge out with minimum amount of air and practically no pressure drop.

LONGER LIFE *(check savings)*

Simple construction, designed for extreme pressures and high moisture content, tested for millions of actuations.

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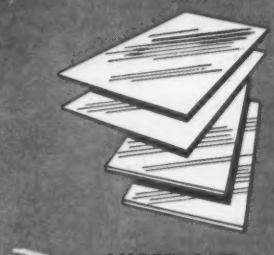
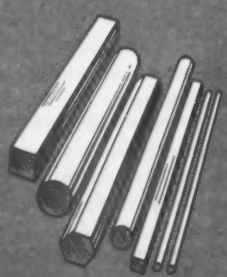


SHEET AND PLATE



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and their manufacturers, aluminum plants, chemical manufacturers, truck and agricultural implement manufacturers, etc. Some of the end products fashioned from these specialty steels are shafts, pistons, axles, sprockets, gears, pinions, worm screws, ratchets, springs, wear plates, dogs, etc.

The other warehouse visited, The American Steel Warehouse Co., is a general type warehouse. It supplies items such as steel, copper, brass, aluminum, stainless steel, bolts, nuts, cap screws, tools, expanded metal, etc. These go to the steel fabricating shops in Oregon, Washington and part of Idaho and Northern California.

CHANCE TO LEARN— Manufacturers' schools do a good job

A GOOD ILLUSTRATION of what may be learned from manufacturers' schools for training equipment users is given in the report of George I. Stoddard, DeVilbiss Company spray painting instructor at the company's Santa Clara plant. Paint finishing foremen attended short courses given by him on the Pacific Coast last summer, and he reports as follows:

One student, a veteran of 30 years as a painter, had recently finished a training movie on spraying techniques. After completing the school, he said, "I'm going to remake the picture and incorporate the correct spraying techniques so that my operators will be doing it right."

Several students reported they were taking the courses to guide them in setting up spray painting training programs at their companies. Mr. Stoddard said that one maintenance foreman employed by a large steel concern pointed out several parts of the course which would enable him to operate his spray painting crews more efficiently, thus saving time as well as money.

While in the midst of his teaching schedule, Mr. Stoddard learned that a student from last year's class who is employed by an automobile manufacturer was given an advancement which he attributed to techniques learned in the school.

In the school for government employees, Mr. Stoddard said, there was a U. S. Navy enlisted man as well as one civilian working with the U. S. Marine Corps who paid their own traveling and boarding expenses in order to attend the sessions. The men were at the school during off-duty hours.

TRAILER BODIES from plastics

A NEW development in the rapidly expanding use of plastics in motor vehicle manufacture is the production of truck and trailer bodies constructed of Vibrin polyester resin.

To date, the largest plastic trailer bodies built by Seaboard Transportation Co., Antioch, Calif., are 24 ft. long by 8 ft. wide and 8 ft. high. These units are used in trains consisting of a tractor and two semi-trailer combinations, with a gross over-all weight of 76,800 lb. The equipment has stood up well to extremely heavy usage in all types of weather conditions and temperatures.

Construction of the plastic trailer bodies is not complicated. The material is molded in wood, steel and plastic molds by "laying-up" the fiber glass cloth and mat, cut to rigid specifications. It is then saturated with the Vibrin polyester resin. As the process proceeds, preformed ribs made of the same material are pressed into the wet lay-up, ultimately forming a complete section. The parts of this section, when cured, became a single integral unit.

The bodies are made in four sections: two sides, the roof and front section. After each section is completely cured, the four are assembled and bonded together on a conventional trailer chassis.

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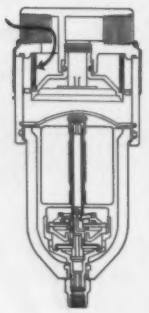
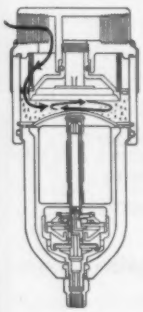
Filtering the air that powers your tools, cylinders and other pneumatic equipment is essential if you want better equipment performance and more output with lowest maintenance costs.

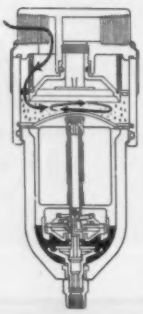
The new transparent bowl Norgren Automatic-Drain Filter gives you this vital protection automatically, whether air pressure is constant or fluctuating, whether or not air is flowing . . . assures clean, dry air under all conditions, without attention. Flow: 0 to 35 cfm; pressure: 30 to 150 psi; temperature 40° to 120° F.



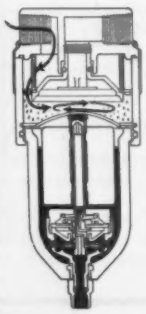
1. Solids are filtered out before air goes to moisture-removal chamber to prevent clogging of drain.



2. Moisture is removed by centrifugal action created when air passes through louvres.



3. As liquid is accumulated in the bowl, the drain valve and pilot valve are closed.



4. Accumulated moisture in the chamber raises the float which opens the pilot valve, discharging the liquid under pressure. Bowl drains instantly and valve automatically closes.

C. A. Norgren CO.

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WRITE FOR . . . CATALOG SHEET

AUTOMATIC FACTORY the coming thing

THE DAY of the automatic factory is steadily advancing, according to the current issue of Stanford Research Institute's news bulletin, "Research for Industry."

The bulletin reports progress after three years work on development of automatic production techniques for electronic equipment. Nearly all existing construction techniques have been studied and experiments have been carried on with an automatic production line designed by the Institute. Current findings indicate that a system using functional, interchangeable units will be most flexible and economical. According to the Institute's design, the automatic production line can turn out approximately ten 5-tube electronic subassemblies per minute.

In the automatic assembly, an etched circuit on a flat plane replaces complicated hand-wiring. By this method, a chemical-resistant coating is automatically sprayed through a stencil or printed through a screen onto a foil-covered base plate. Immersing the plate in an acid bath eats away the unprotected metal, leaving the circuit pattern intact.

Increased demands by military, industrial and home users boosted last year's production of electronic devices to the $6,000,000,000 mark. This is a 50% increase over peak wartime production. Working with this output, the engineers say, the automatic production line could improve quality control and reliability, minimize waste and bring a reduction in manpower costs.

ATOMIC ENERGY versus oil industry

"INVASION by atomic energy of some of the markets now served by petroleum should be welcomed by the oil industry," according to Dr. Monroe E. Spaght, executive vice president of Shell Oil Co.

He explained that such a move would add inducement for the industry to continue to upgrade lower grade products to meet needs in a premium market.

"Taking the long view," Dr. Spaght said, "the engineer today tells us that both the gasoline and diesel engine will almost surely be superseded. The gas turbine engine, because of simplicity of design and potentially higher operating efficiency, can be expected to replace the reciprocating engine in many applications in aircraft, ships, locomotives and stationary power plants."

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This particular BEAN Pump operates at 2000 pounds pressure, delivering only 11 gallons of water per minute. The high-pressure water jets remove the scale instantly and the de-scaled forging is immediately formed in the dies. Two BEAN Pumps handle 3500 projectiles per day.

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PROFIT SHARING IN ACTUAL PRACTICE

Industrialists describe successful experience in their own companies

A CLOSE-UP of how profit sharing actually operates was given by trustees of the Council of Profit Sharing Industries at a meeting in San Francisco September 17. Here industrialists were able to hear from men who could speak from experience.

Thomas P. Pike, president of the Thomas P. Pike Drilling Co., Los Angeles, and sole Western trustee for the Council of Profit Sharing Industries, told of his profits being multiplied by 370% net, after his employees had been paid more than 25% of the profits for the past six years in addition to good wages on a par with or greater than those paid for similar work in the area. He not only shares profits with his personnel, but the company plan of incentive management with profit sharing also shares the problems of management and complete information about the finances of the business with the workers.

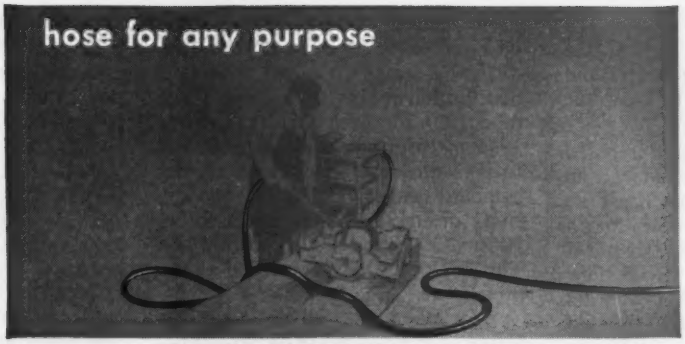
An open book

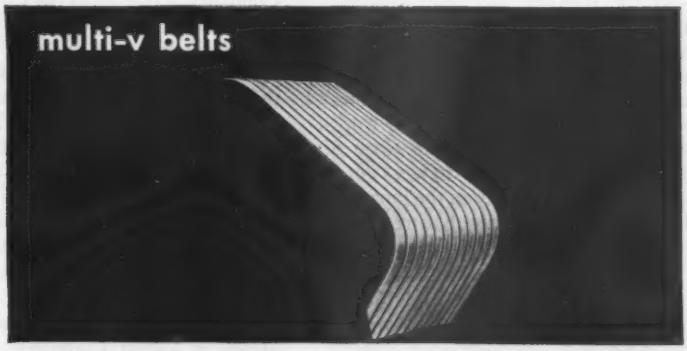
Pike created quite a stir in the audience when, in response to a question from the floor as to the extent to which his management shared information with employees, he stated, "There is nothing in the conduct of our business which an employee may not know, even the salaries which I as president and my associate executives draw. We tell all on the basis of mutual confidence."

He announced that within a week he would divide $110,000 among 224 employees who had helped to create this profit by teamwork and intelligent application to their jobs. In six years of profit sharing, an average of 179 employees had received $376,000 including the present distribution. In addition, Pike Drilling Co. has dispensed another $50,000 this year to personnel in the form of fringe benefits which include life insurance, vacation pay, Blue Cross payments and other features of the company "Pay Package" which Pike considers to be a sound modern management practice as well as business under the Golden Rule.

William Loeb, newspaper publisher and owner among others of the Manchester Union Leader, of Manchester, N. H., spoke of his successes with a profit sharing plan operating with five different labor unions in the organization. His most arresting statement, in speaking of the reasons for profit sharing was: "I do not think it does any good to talk about free enterprise

The Industrial Business-Minded Bank





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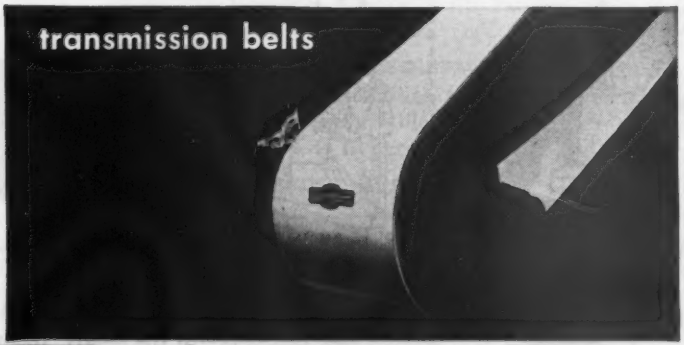

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as such. The present-day worker is a pretty intelligent fellow, and if the employer can show him a better and more prosperous way of life, his whole approach to life changes."

He stated that when he purchased the Manchester Union Leader from the widow of the late Frank Knox, he was faced with labor troubles and a demand for a raise in wages. He put it up to the employees to decide how they should operate . . . profit sharing or wage increases? One-half of the staff wanted profit sharing on a trial basis and the balance got their wage demands. The profit sharing proved to be so much more desirable that all finally asked to be included in it. When he contemplated raising the cost of a Sunday edition from 10¢ to 15¢, the workers, who stood to get an increase of $200 each from the move, voted against it as bad policy in the long run. He has found profit sharing sound business.

28-year-old plan

C. Neil Norgren, assistant general manager of C. A. Norgren Company of Denver, described his company's profit sharing plan which has been in operation since 1925, distributing profit sharing benefits to employees which have varied from 10% to 46% of the base wages received. The 46% distribution means an average check of $1,500 for each employee. Since 1945 his firm has paid out $600,000 to personnel over and above regular standard wages. Individual productivity of employees has increased between 300% and 400% since 1940. The employees have never had a non-profit year.

John W. Leslie, chairman of the board for Signode Steel Strapping Company, a trustee of the Council and a member of a profit sharing firm, said, in answer to a question as to the relative success of profit sharing plans, that of 300 plans investigated by the Council's Profit Sharing Research Foundation, only four had proved unsatisfactory. He stated that unionism is no bar to profit sharing and the only way to solve the problems which are created by labor-management tensions is to provide concrete benefits for the workers.

Clarence Wimpfheimer, president of American Velvet Company, Stonington, Conn., started his profit sharing plan with the help of textile union leaders when he acquired the business after a lock-out strike of 16 weeks. This year the workers' average profit sharing check amounts to 30% of wages already paid. No labor discussions ever call for outsiders to participate. They are all settled internally and at the level of the employees. Wimpfheimer states that his non-profit sharing competitors have either sold out or are complaining of poor business while his firm prospers year after year. He said, in concluding his talk, "We believe our workers are writing union history right now."

Profit sharing trust

Elliot A. Johnson, general counsel for Schlumberger Oil Well Surveying Corporation of Houston, Texas, described his firm's "profit sharing trust" which in nine years of existence has accumulated $5,011,573 in which over 1,400 employees participate. In 1952 the company contributed $1,382,464 to the profit sharing trust fund. In a firm with 3,000 employees widely scattered over the country in small working units, he stated that the plan had reduced turnover of employment, increased interest in efficiency, and that it had succeeded in promoting loyalty and eliminating waste.

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Pacific Telephone

JIG PARTS from concrete

The concrete jig has proved to have a dampening effect on vibrations, preventing jarring of the precision-set steel jig parts that it supports.

USE OF CONCRETE for non-adjustable jig parts is considered one of the greatest potential strides in the development of aircraft jigs.

Aircraft jigs are the mechanical aids which hold a piece of work in the correct position during fabrication and assembly. In the past both the base and the adjustable parts have been constructed of steel, but in recent months Boeing Aircraft Co., Seattle, has been using a concrete base jig in its B-52 Stratofortress production line with extremely satisfactory results. Compared with the steel-on-steel jig, cost of the new arrangement is approximately 25% less, and time required to construct the concrete base about 75% less.

After watching the jig prove itself during the past months, Boeing engineers are satisfied that concrete, as a solid base, can be depended upon to hold jig adjustments permanently. In addition, they feel that the concrete's present job of supporting huge steel jig members in which B-52 horizontal stabilizers are assembled is only the beginning. They predict that such a combination of concrete and steel is likely to be the jig of the future.

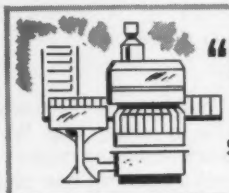
EDUCATION and industry

A PRESSING problem facing educators today is that of closing the gap existing between university and industry. All too often the recent college graduate is saturated with theory. He tends to picture industry rather unrealistically. This misconception seems to stem from a lack of coordination between the faculty and industry executives.

This condition, all too prevalent in our schools today, places a hardship on students seeking a career in industry. Business also loses. In many cases a complete reorientation and training program is necessary to acquaint the new employee with the facts of business operation.

Recognizing this gap in the continuity of contemporary education, the Department of Business Administration, University of California at Berkeley, has set up a course giving the students opportunities to meet with top management of large corporations and frankly discuss company operations, problems and policies.

During the spring semester the Pacific Telephone and Telegraph Co. donated four of its top executives for the 10-week course. Results were extremely gratifying from the standpoint of both students and faculty. The business executives thoroughly enjoyed the opportunity of meeting future management and discussing the company's aims and problems with them.



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DART TRUCK CO. has developed a 60-ton end dump truck to be put to work at the Bagdad Copper Mines in Arizona.

This new off-the-highway job is entirely different from even the largest highway trucks. It is powered by two Buda super diesel engines, totaling 700 hp., mounted amidship of the truck's underbelly, one on either side. With fluid drive, power from the engines is directed to each of its two rear planetary axles.

The reason

Need for such a mammoth load carrier arises from continuing efforts to move more material faster and at lower costs.

DRILLING FOREMEN visit the office

THOMAS P. PIKE Drilling Co. has recently had encouraging results in coordinating interdepartmental functions by bringing drilling foremen into the main office for a two weeks course in office procedure, reports and records. Toolpushers from the company's 16 rigs are being rotated to work on the receiving end of main office activities for a period of two weeks each.

As soon as these key men realized the complicated nature of the company's records, and the absolute necessity for accuracy and cooperation among all departments, handling of such records immediately improved. It became apparent to all concerned that the efficiency of the organization had a direct effect on the company profit sharing fund.

In addition to instruction on the need for accurate records, each drilling foreman is given an intensive course in costs and their impact on business activity. Financial statements are reviewed; the subject of cash requirements and the manner of balancing income and out-go are explained to each foreman.

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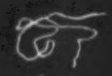

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Master power drives are available in thousands and thousands of ratings (⅛ to 400 HP) . . . in open enclosed, splash proof, totally explosion proof . . . horizontal or vertical . . . for all phases, voltages and frequencies . . . in single speed constant speed and variable speed types . . . with or without flanges or other special features . . . in many types of gear reduction up to [illegible] . . . with fluid drives . . . with brakes . . . with combinations of all these units . . . and for every type of [illegible] . . . Master power drives can be consistently delivered to [illegible] . . . Let us help you select the power drive for YOU.

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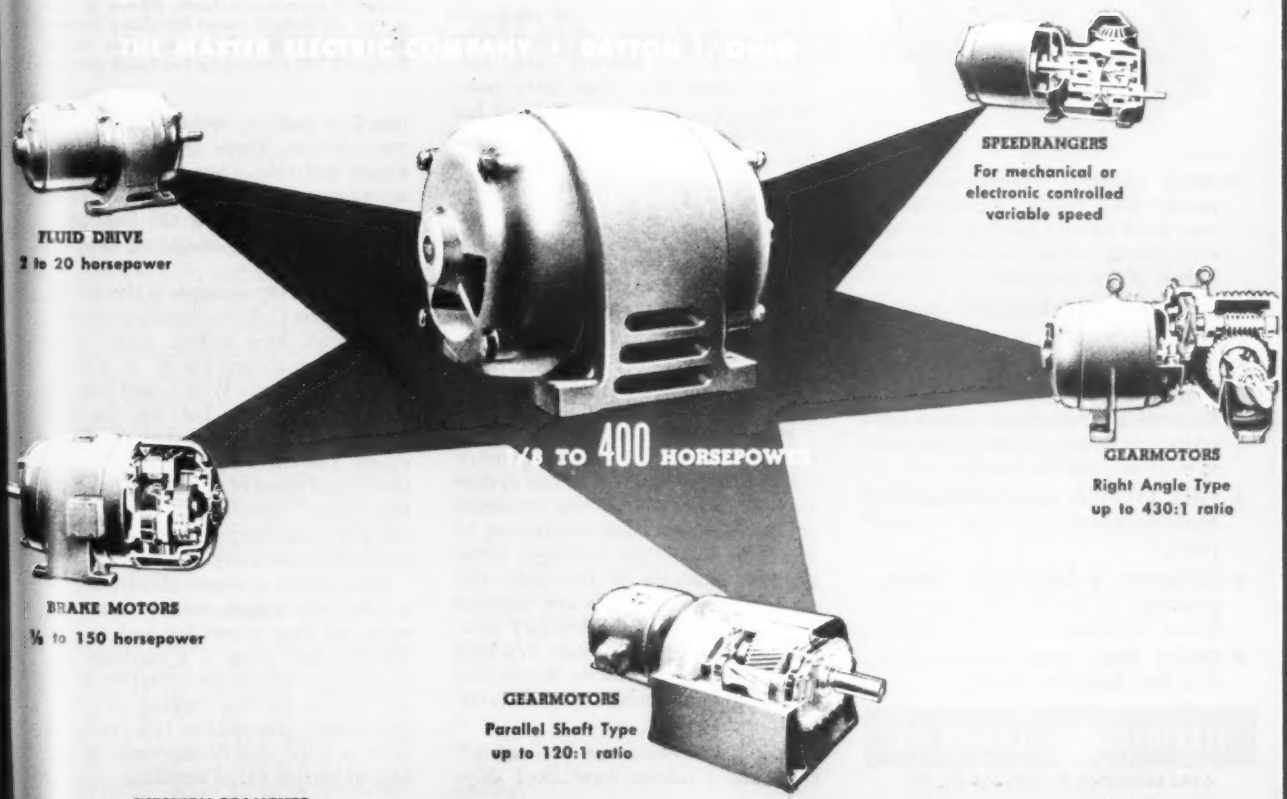

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SHIPBOARD CRANES FOR FUTURE CARGO HANDLING

Advantages: versatility, streamlining, speed of handling

CARGO HANDLING by properly designed shipboard cranes shows great promise of reducing time and costs incurred in loading cargo vessels.

A good part of the loading and unloading of merchant vessels is presently being done with equipment known as "burtoning gear." Disadvantages of this system include the large volume of booms, rigging and winches, high equipment maintenance costs, and the considerable time required to get the boom set, the running lines reeved and everything else ready for operation. All of this requires considerable manpower and generally cannot be done before the ship is tied to the pier.

Shipboard cranes, on the other hand, appear to be much more satisfactory. This system employs three elements: (1) a ship with extremely large hatches; (2) unitized and packaged loads; (3) properly designed shipboard cranes for efficient cargo handling aboard ship. This three point program is entirely practical and has been thoroughly proven in detail. Its success can be demonstrated in a variety of cargo handling situations.

Large hatches help

It is entirely possible to build ships with large hatches, although this feature is not absolutely essential. Large hatches, however, eliminate the problem of stowing material under the wings and help ease cargo into these areas without breaking down the loads.

Package loads are being rapidly adopted by many progressive carriers. Some of the advantages of this system are easy shoreside handling, minimum of checking, and small articles can be sealed to discourage pilferage. Little advance planning is necessary and package loads eliminate any juggling while loading the ship. Military service has developed the system to a high degree and has proved its desirability from both time-saving and cost standpoints.

Shipboard cranes are not untried. European countries have used shipboard as well as dockside cranes for many years. These cranes are fast, simple and safe. They pick up a load anywhere within their operating radii on the dock and stow the load anywhere within their operating radii on ship.

SHIPBOARD cranes offer faster, more efficient cargo loading as well as reduced maintenance costs. Above is one of two shipboard cargo handling cranes aboard the Army Transportation Corps Barge FS 790 picking up her hatch covers.

A noteworthy example is the installation of two Colby hydraulic-powered, high-speed, level luffing, cargo handling cranes aboard the W. R. Chamberlin Company's West Coast lumber schooner *C-Trader*. This was the first installation of its kind aboard a U. S. vessel. The effect of the cranes on efficiency and speed of cargo handling was impressive. Simplicity and accessibility of crane mechanisms cut maintenance time and costs.

Installation of cranes aboard ship is a relatively simple task because all units are shop assembled and tested. The finished crane is a machine immediately available for operation without special reeving, rigging or other preliminary preparation. It is expected to be an important development in the field of marine cargo handling.

THE FACT that each sawmill differs from its neighbor is attractive to the tourist but wasteful as far as the economy of the lumber industry is concerned.

SAWMILL MACHINERY STANDARDIZATION

What will it mean to you?

By MILTON H. MATER
Mater Machine Works
Corvallis, Oregon

THE LUMBER industry has witnessed some remarkable changes during the past few years. Post World War II prosperity has given it a chance to catch up with other industries. Interest in mechanization of sawmill operations has been high and much progress has been made in this direction.

True, the lumber industry has by no means mechanized most of its operations, but realization of the importance of mechnization daily increases. Western sawmills have long shown a steady trend toward mechanization.

A bold start has been made in mechanizing sawmill operations. Next on the lumberman's agenda is standardization of sawmill production and products.

Individualists

Sawmill operators are highly rugged individuals and each sawmill is an expression of its operator's personality and theories as to the best way to saw a log. Of the 60,000 sawmills in the United States, the largest portion are small mills—many of them "haywire" operations assembled from old auto parts and odds and ends of equipment.

The machinery for the other mills is built in part by a score or less of nationally known sawmill machinery manufacturers and to a large extent by small machine shops catering to a local trade. Mills are designed either by their operators or by one of a handful of mill designers. Some mill designers have achieved a national and international reputation; others design mills for a particular locality. The majority of these designers are men of broad experience but often little formal engineering education.

Each of these components of the creative end of sawmilling is individualistic. No two manufacturers construct machinery the same way, or to the same standards. No two mill designers use the same standards. Few mill operators agree on all phases of sawmilling.

Moreover, within the general framework of the sawmill industry, there are no sawmill machinery manufacturing associations, no sawmill engineers' associations, and few lumbermen's associations which might represent the rank and file of the people directly concerned in the problem of standardization.

Benefits entire industry

In industries where standards have been established, the standardization process has been found to benefit every segment of the industry, and ultimately the final consumer. A recent report by the American Standards Association, after a special survey of its 110 trade association and technical society members and 2,000-plus company members, lists some of these benefits:

(1) Savings from reduced inventories of materials, parts and end products.

(2) Savings through interchangeability of parts and buying of economical quantities.

Example of the need

There are few standard dimensions in building sawmills and in the machinery to go in those mills. Compare these figures. See how mills cutting the same type of wood and with the same headblock opening (indicating that they cut roughly the same size wood) differ in essential dimensions.

Species and headblock opening	Carriage No.	Saw line to rail (in inches)	Rail center to center (in inches)
Pine mills,			
48-in. headblock opening	A	4½	54⅜
	A-21	5½	52
	A-22	8	54
	A-26	8¼	54
	A-29	6⅞	54½
Fir mills,			
54-in. headblock opening	A-14	5	54
	A-19	9	60
	A-23	8	60
	A-25	4⅝	60
	A-28	7	54½
Fir mills,			
60-in. headblock opening	A-15	6-7/32	62-3/16
	A-18	4½	66½
	A-20	5-9/16	66

(3) Savings through better coordination, decreasing storage and warehousing costs and more economical use of machines.

These savings can be turned to excellent use in the lumber industry. Through standardization, four distinct groups will benefit directly:

(1) The lumber industry as a whole and lumber's part in the material use picture—this involves wood waste utilization and reduction of waste during lumber production;

(2) The sawmills themselves;

(3) The sawmill machinery manufacturers;

(4) The consumer.

Utilization

Much of the recent attention to standardization in the lumber industry has resulted from its close relationship to conservation and wood waste utilization. An historic meeting held in New York in January 1953 by the American Standards Association was called at the request of the Conservation Division, Defense Production Administration, in recognition of this fact.

The Forest Service has estimated that about half a billion cubic feet of wood is lost every year during lumber manufacturing. It was with these statistics in mind and with a view toward reducing wood waste through mechanical or operating improvements, that the conservation division requested the Association to call a meeting of interested parties. It concerned itself primarily with reducing wood waste at the source rather than utilization of wood waste after it is stacked in the yard waiting for disposal. Everyone agrees that there is need for improvement in sawing practice—particularly in the small mills—and this improvement will result in better lumber with less waste.

The New York meeting ended with the recommendation that a performance standards for small sawmills project be handled by a special committee, with the American Society of Mechanical Engineers, the Forest Products Research Society and the National Lumber Manufacturers Association asked to sponsor the project. Thus originated in 1953 the first attempts at standardization in lumber manufacturing.

Recommendations for sawmill standards are still a long way off. Further away is realization by the mill operators, sawmill manufacturers and others affected just how standards will benefit them.

Two methods

Standards for any industry may be set up two ways: (1) as standards of performance with end results standardized, or (2) as standards for the methods by which desired results can be attained. It is generally agreed that the more flexible method is to set standards for the end result. However, in the sawmill industry there is a little doubt that standards for the machinery used are very important in achieving the desired end results. While it is essential that the sawmill operator be free to choose which method or which equipment will give the desired end product, standardization within various choices of machinery will prove a great boon to the industry.

Operators benefit

The extent to which sawmill operators will benefit immediately from standarization in the sawmill industry can be gauged from the following information not available to a sawmill operator:

(1) There is no way of knowing at the present time roughly how many board feet a shift a sawmill with a certain number of men and a specified

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INTERNATIONAL mixers are functionally designed to the process application and for the greater majority of mixing problems, offer a simple, compact and inexpensive solution. They are available in portable, top entering, and side entrance types, in a complete range of sizes and speeds with either dual or single propeller assemblies. Of rugged and reliable construction, INTERNATIONAL mixers are precision mechanical machines built for efficient, low cost, round the clock operation.

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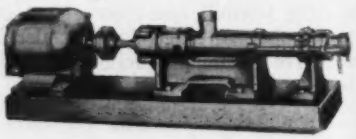

This pump pumps *everything*—even highly viscous fluids, pastes, suspended solids—in uniform flow *without* pulsation. Lumpy materials are delivered with virtually no disintegration, yet with ample pressure to discharge through screens or filters. Moynos are made of all stainless steel and combine outstanding self-priming performance with *positive sanitation*. The smooth contours of the "progressing-cavity" pumping element have no crevices within which bacteria can lodge and thrive, and the entire unit may be quickly dismantled for thorough, *effective* cleaning. No other pump is like the capable, *low-maintenance* Moyno. It does everything well—works where *nothing* else will, and will save you money many ways.

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amount of horsepower cutting a certain timber species will produce. Five men may cut anywhere from 10,000 to 70,000 bd. ft. per day in a mill of similar size depending on the type of equipment used, the mill layout and other factors. Facts and figures are not available to most mill operators.

(2) There are no sawing standards at the present time which hold the saw kerf within certain limits.

(3) There are no testing standards for setworks, which determine the thickness of each board.

(4) Sawmill machinery has no standards. Each manufacturer and each mill uses its own track gauges, track weight, track design, track placement with relation to the saw, log deck design, edger designs, etc.

Lack of standards results in almost all machinery for sawmill use being custom built—i.e., specially built to fit one particular mill. Custom built machinery is the most expensive machinery to buy, build and install. A simple set of basic standards will make sawmill machinery purchasing dollars extend further in buying better machinery at probably less cost. With the existing situation, the sawmill operator who wishes to replace an outmoded or wornout sawmill carriage and track must either revamp his mill structure to accommodate the new one, or have the machines completely custom built for him.

Machinery does not fit interchangeably. Parts replacement is therefore expensive; mills are required to carry a considerable stock of spare parts; mills are often required to maintain machine shops of their own to take care of machinery because standard parts are not easily bought. With even the most elementary standardization of sawmill machinery in effect, much of this costly individualized machinery and parts replacement would be eliminated, still leaving the millman entirely free to choose the types and makes of machines which he feels can do his job best.

Standardization will make financing sawmill machinery considerably easier. Financing of machines which will fit several mills can be handled more like a machine tool than custom built machinery.

Manufacturers benefit

One of the outstanding characteristics of the lumber industry is the sensitivity with which it adjusts to supply and demand. When finished lumber is in large supply, the price drops sharply. When logs are in short supply, the price of logs rises sharply.

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More often than not, the smaller and medium sized mills are caught between having paid the high price for logs and having to sell the finished lumber at the low price. When lumber prices are low, mills which are financially fixed to do so stock lumber till prices are more favorable. A lumberman may find himself skidding from the crest of prosperity to the depths of recession several times a year.

This hypersensitive characteristic has been inherited by the manufacturers who build machines for sawmills. When "things are slow," as the saying goes, few lumbermen dare order new machines for future consumption. When the market looks up, every lumber operator decides he needs new machinery and the factories hum with expensive overtime to meet the demand. Most manufacturers could better their delivery dates and prices if there were sufficient standard items to stock up on in slower times. For instance, if there were some standards as to track gauges and track weight, rails could be readied for the time of demand. The industry would level its production, to the profit of everyone concerned, rather than adjust to a constant boom or bust emergency.

Standardization will mean fewer models are required and manufacturers can produce better machinery at a lower cost. The energy, time and funds now going into carrying large stocks of non-standard parts, custom building, custom selling and custom installation can be diverted to research and development on new and improved machines and on higher safety standards.

Consumer benefits

What would standardization mean to the man who walks into his local lumber yard to buy some lumber for new bookshelves? How much of the sawmill operators' and machinery manufacturers' savings will be passed on to him? That, of course, is a question difficult to answer in terms of dollars and cents. But there is no doubt that the ability to produce better lumber at less cost, the time and money spent for conservation, and the diversion of funds into research would be of direct benefit to the consumer. One has only to consider the history of the American automobile industry to realize how standardization benefits the consumer.

A new idea

Sawmill standardization is such a new idea to the lumber industry as a whole that it is far removed from finding itself in the situation occupied by the weather, with everybody talking about it and nobody doing anything about it. The idea of standardization or regimentation of any kind, no matter how beneficial to his business or purse, is still contrary to the very nature of many sawmill operators. They need to be shown the value of standardization before they talk about it. After it has reached the everybody-talks-about-it stage, the time for action will be at hand.

Standardization, to be effective, should come from the sawmill operators' end. I have talked with many other sawmill manufacturers about standardization of sawmill machinery and unqualified enthusiasm for the idea has been shown. But manufacturers, after all, must please their customers and hesitate to employ any standards which mill operators will object to. Sawmill operators, working through their organizations, will eventually set the pace.

I think we can eventually look forward to organization of sawmill standardization committees formed in each of the sawmill operators' organizations, working closely with a similar committee formed by manufacturers, under the guidance of the American Standards Association.

TRACKLESS MINING achieves economy

TRACKLESS mining operations require less common labor but increase the need for semi-skilled labor, L. M. Kinney, general superintendent of Pend Oreille Mines and Metal Co. at Metaline Falls, Washington, told the American Mining Congress.

Mechanization of equipment has lessened the amount of physical effort and saved time in setting up and tearing down of equipment. This has increased the time spent in productive work, he said.

At present 65% of the ore is coming from trackless mining headings with 40% of the men. Thirty-five per cent of the ore is being mined from track mining headings with 60% of the men.

Manufacturers have been very cooperative and helpful in making the changes or recommendations for improvements in operations and design of equipment.

The use of trackless mining equipment underground has increased the tons per man-shift and decreased costs per ton to make the operation a profitable one instead of a losing proposition under present low metal prices.

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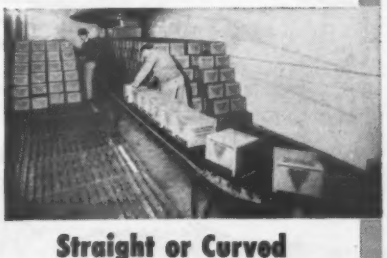

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Send for Bulletin 63-D, describing Standard gravity and power conveyors and conveyor units — address Dept. WI-1153.

FILMS AND FILM STRIPS

MEEHANITE MEANS better castings

Written and produced for designers, engineers, production and maintenance men, purchasing and managerial executives, this motion picture now available for showing provides engineering facts and figures about Meehanite Castings, their types and applications.

The 30-minute sound picture takes you into the office of a metallurgist for the story of foundry controls used in the production of Meehanite metal which makes possible the regulation and achievement of required service qualities in castings.

It also takes you into the foundry of a manufacturer and into the plants and machine shops where users of the castings are at work.

At no cost to you, a 16 mm. print of this picture is available for showing at your plant, society or any group meeting. Write to *Compton Foundry*, 1320 S. Alameda St., Compton, Calif.

THOR TOOLS explained

The initial film in a series of movies to be produced by the new Motion Picture Division of *Thor Power Tool Co.* is a 20-minute 16 mm. sound movie on "The Inside Story of Thor Tools."

It is filmed in color, except for black and white factory shots, and takes viewers on a tour of Thor's Aurora, Ill., works to demonstrate the manufacturing processes necessary in producing an electric tool armature.

The movie was initially released to branch offices for scheduled distributor meetings, with the other 16 branches slated for later showings.

A second movie is currently being produced featuring the company's mining tools for use by contractors tools distributors.

MECHANICAL SEALS for pumps

A 20-minute full-color film on mechanical shaft seals for centrifugal pumps is now available through Byron Jackson Co. Designed for showing to engineering and maintenance meetings, this film covers mechanical seals from design to maintenance. Various seal types and their applications are described in this educational film and illustrated by animated drawings.

Arrangements for film showings can be made by contacting L. C. Kimball, *Byron Jackson Co.*, Los Angeles 54, California. Also available is a condensed transcript of this film in bulletin form, complete with photographs and drawings. Request BJ Bulletin No. 153-10,000.

TEN MOVIES on agriculture

A new circular describing ten agricultural motion pictures is being distributed by *Union Pacific Railroad's* Agricultural Development department.

Twenty-five thousand copies are going to county agricultural agents,

Heavenly bodies... It takes a king-size telescope to probe the heavenly bodies that lie zillions of miles away from the Palomar Observatory in Southern California. And king-size springs to cradle the world's largest star-gazing installation. So the super-scientists naturally turned to California for super-springs—best in the west since '23. All sizes, all types, all wires.

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vocational agricultural teachers, chambers of commerce, agricultural associations and industries, veterans farm instructors, high school superintendents and others.

The four-page colored circular describes each film and tells how it may be obtained.

The Agricultural Development department's two newest films, "Hog Sense" and "Blades of Green," are included in the pamphlet along with "Cattle Country," "Western Sheep," "Thirsty Acres," "Potatoes Unlimited," "Along The Milky Way," "Culling Chickens," "Culling Sheep," and "Wheat Smut Control."

CONTRIBUTIONS OF industrial research

A new 10-minute 16 mm. color-sound picture, "It's Only Beginning," telling the story of industrial research and its contribution to the ultimate consumer, is now available on a free loan basis from the *Scientific Apparatus Makers Assn.*, 20 North Wacker Drive, Chicago 6, Illinois.

Program chairmen of technical and civic groups, science teachers and representatives of other interested organizations may make arrangements for the showing of the film by contacting any one of the 206 manufacturer and supplier members of SAMA.

The film is being made available without charge to interested scientific, school and civic groups by the apparatus makers as a part of their Public Information Program.

Ideal for rounding out a technical or civic meeting devoted to industrial research and development in this country, the movie emphasizes the tremendous cost of industrial research and its importance to progress. The film also illustrates in an unusual and interesting manner how basic and applied industrial research is financed through corporate profits.

CONNECTORS— multi-contact electric

Cannon Electric Co. has a 16 mm. training film, in Kodachrome, designed for persons in electrical, electronic and aircraft fields who need to understand the functioning and servicing of electric connectors. Technical features and applications of Cannon plugs are shown, with sequences, for instance, on launching of a guided missile and oil exploration. Inquiries for film may be made to Cannon Electric Co., P. O. Box 75, Lincoln Heights Station, Los Angeles 31.

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BOOKS FOR INDUSTRY

QUALITY CONTROL for welding

To enable engineers of machinery manufacturers and fabricators to acquire both cost and quality control over welding operations, The Lincoln Electric Co. is making available a set of Weld Standards. The Standards are available on tracing paper so that they can be blueprinted or otherwise reproduced for the purpose of giving engineers and production personnel a standard for communicating welding procedure on drawings. They are based on procedures developed by Lincoln and the weld symbols of the American Welding Society.

A common problem for engineers and designers in designing for welded machines or structures is assuring that the welds are all made as specified. This is a problem in both communication and cost and quality control. These Standards help solve both aspects of the problem.

With a simple letter designation, they specify, according to plate thickness, both the type and size of weld, as well as how it should be made. With both engineering and shop using the same standards, having prints of the standards available at all times, the engineer can be assured that the weld he has specified will produce the results for which it was designed. The shop can be assured that it is making the weld desired according to specifications for economy, strength and appearance.

The complete set of 19 sheets on tracing paper in a loose leaf binder is available from *The Lincoln Electric Co.*, Cleveland 17, Ohio, for $1.00 per set, postage prepaid, in U. S. A.; $1.50 elsewhere.

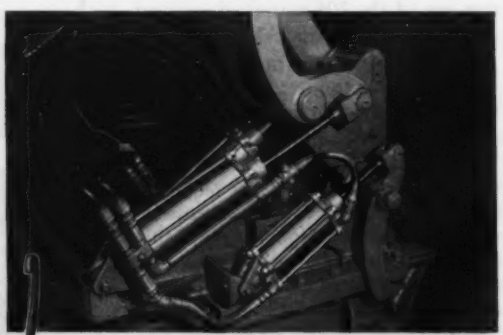
BARGAINING on productivity

"Bargaining on Productivity — A Management Guide" by Fred Rudge is published by *BNA Inc.*, a division of the Bureau of National Affairs, Inc., Washington, D. C., and is available for $5.75. The address is 1231 24th Street, N.W., Washington 7, D. C.

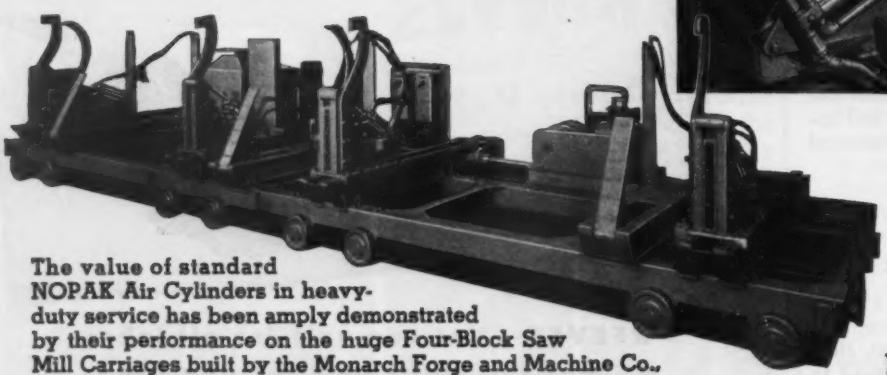
This book describes the trend of more and more companies and unions turning to facts and figures as a substitute for economic force in resolving their differences. Five years ago the number of management people interested in a guide to bargaining were few and far between. They were the large companies and organized industries—pacesetters—plus a handful of smaller concerns with a progressive approach to collective bargaining. CIO's United Auto Workers has hired a group of economists to study the issue of a guaranteed annual wage and try to arrive at feasible solutions. Recently, unions have placed heavy emphasis on productivity as a basis for raising wage rates.

In his book, Mr. Rudge undertakes a similar assignment for those on the management side concerned with the setting of wage rates. He explains the labor view of productivity as it relates to wages and how this view developed. He clears up some of the confusion that exists over the meaning of pro-

"Double Hook Dogs"
are Powered by NOPAK Cylinders
on Monarch Four-Block Saw Mill Carriages



Close-up view of "Double Hook Dog" assembly shows how 3 NOPAK Model "E" Cylinders of different diameters and stroke lengths are employed to operate this mechanism. There are 4 of these "Double Hook Dogs" on each carriage.



The value of standard NOPAK Air Cylinders in heavy-duty service has been amply demonstrated by their performance on the huge Four-Block Saw Mill Carriages built by the Monarch Forge and Machine Co., Portland, Ore. Fourteen NOPAK Cylinders are used on each of these carriages which are extremely rugged in construction, and designed especially for the large western mills which utilize old growth fir and redwood logs. Monarch continues to specify NOPAK Cylinders because they really stand up under the rugged operating conditions to which they are subjected day after day, throughout the year.

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ductivity. He describes and evaluates the various yardsticks that are available for measuring productivity and concludes with a series of highly practical suggestions to management negotiators facing demands for wage changes.

LUMBERMEN'S office handbook

The West Coast Lumbermen's Association is offering a new service to lumbermen in the form of a "Handbook for Lumber Offices," written for the untrained employee who is a stranger to the ways and language of the lumber industry.

Chapter headings indicate the scope of the material: "How Lumber is Distributed," "Lumber Grading," "How to Figure and Invoice Lumber," "Methods of Quoting," "Glossary of Terms," "Commonly Used Lumber Abbreviations" and "Names of Commercial Timbers."

While the glossary in itself is probably the most ambitious ever prepared by the industry, it is even more unusual because it includes each word in shorthand. This feature was preprepared by Gregg Publishers and is authoritative.

The charge to lumber offices for this 32-page handbook is $1.00 per copy payable with the order to *West Coast Lumbermen's Association,* 1410 S.W. Morrison St., Portland 5, Ore.

X-RAY ANALYSIS in two volumes

Two new books recently published by the Philips Technical Library are available at $2.00 each from the Research & Control Instruments division, *North American Philips Co., Inc.,* 750 South Fulton Ave., Mount Vernon, N. Y.

Volume I, 100 pages, entitled "Data for X-ray Analysis," by W. Parrish and B. W. Irwin, contains charts for solution of Bragg's equation. Charts cover K radiation for molybdenum, copper, cobalt, iron and chromium. Also included is a table that converts minutes into decimals of a degree.

Volume II, 84 pages, by W. Parrish, M. G. Ekstein and B. W. Irwin, contains tables for computing the lattice constant of cubic crystals. Tables give K radiation values for the square root of N times wavelength divided by 2 for copper, nickel, cobalt, iron and chromium.

Volume II also contains a table giving sine squared theta values in 0.1 degree steps from 10 to 88 deg., a table giving lattice constants of cubic substances, and a chart showing 33 representative cubic diffraction patterns.

NATURAL GAS INDUSTRY see how it grows

Gas Appliance Manufacturers Association has issued a 50-page 1953 edition of its brochure, "Natural Gas Construction Data," presenting a detailed picture of projects, companies and communities involved in current expansion of the nation's natural gas industry. Information includes a listing of the 165 cities which will receive new natural gas services; the names and addresses of pipeline and utility companies concerned in pipeline construction approved from July 1, 1945, through May 31, 1953; description of pipeline projects authorized, completed or pending in that period, according to mileage, cost, line sizes, estimated steel pipe tonnage, compressor horsepower, FPC docket numbers and purpose.

The brochure may be purchased for $2 a copy from the Marketing and Statistical Department of the *Gas Appliance Manufacturers Association,* 60 East 42nd St., New York 17, N. Y.

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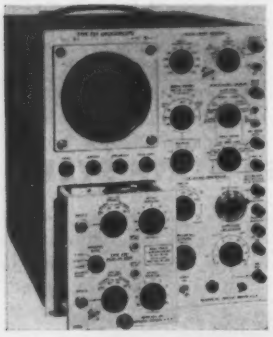
NEW MATERIALS & EQUIPMENT

USE RIP-OUT POSTCARD for more information on products introduced this month.

1

Single oscilloscope with wide range facilities



Type 535 cathode-ray oscilloscope is adaptable to almost any phase of laboratory investigation by providing a wide range of facilities: plug-in preamplifiers, new accurate sweep delay circuit, wide time-base range, and high accelerating potential. Sweep circuit offers twenty-four calibrated sweeps and also continuously variable uncalibrated sweeps. Trigger selector permits automatic triggering or amplitude selection. *For a folder giving fuller explanation of Type 535's versatility, circle key number on rip-out postcard.* Tektronix, Inc.

2

Side-loading fork truck stacks long loads

A new 30,000-lb. capacity Traveloader, combination side-loading fork truck and load carrier, can stack or haul long, bulky loads such as lumber or steel stock in a 12-ft. aisle. Because it picks up loads from side, hauls them lengthwise within width of unit and stacks them parallel to aisles, Traveloader requires much less aisle-width in which to operate than conventional fork trucks of same capacity. *For specifications and more information, circle key number on rip-out postcard.* Baker-Raulang Co.

3

Here's a free selector offer

Starting with any known factor, such as I.D., O.D., minimum burst, working pressure required or bend radius, plus aid from this selector, any designer or maintenance man can determine proper hose for particular operations. A selector will be sent, no charge, to users of hydraulic hose or to any company that feels that a strong, flexible, lightweight conductor for gases, liquids or greases might improve products or maintenance work. *Circle key number on rip-out postcard for yours.* Lee Rubber & Tire Corp.

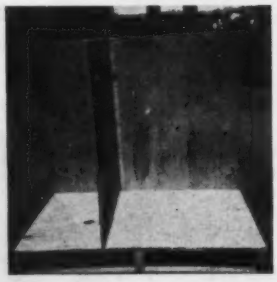
4

More inches between regrinds with carbide tipped gun drills

"Carbide tipped gun drill," recommended by manufacturer for deep hole drilling operations, is said to produce a finish and hole size that, in many instances are comparable to those obtained by a reaming operation. Drill minimizes runout by maintaining closer drilling concentricity and increases production by high speeds possible with carbide. *For additional details on these gun drills, circle key number on rip-out postcard.* Chicago Latrobe.

5

Partitioned pallets for systematic storage



Heco partitioned pallets are now available with off-center plywood spacers that are said to permit compact, safe and systematic storage of almost any merchandise. Product provides for warehousing of various sized crates and boxes on same pallet and for storage of a wide range of material at same time. *Circle key number on rip-out postcard if you would like to receive more material on Heco partitioned pallets.* Hamerslag Equipment Co.

6

Introducing a pair of special resins

Two new, non-shrink laminating resins, Toolplastic L-900 and Toolplastic Gelkote L-910, are modified epoxy resins with 100% solids content. Tests are reported to indicate that both are not corrosive or brittle and are easy to handle, apply, and cure at room temperature with no

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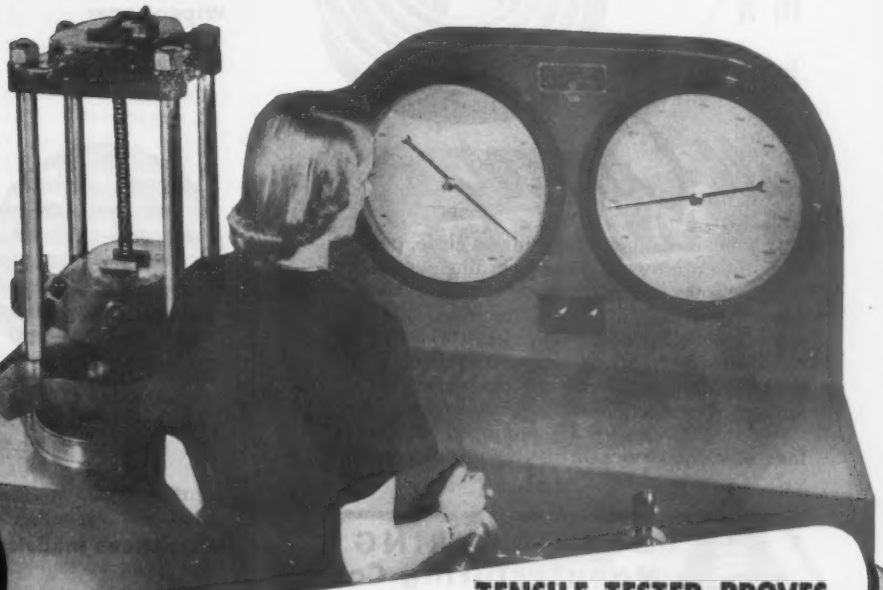

TENSILE TESTER PROVES THE EXTRA LIFE IN ATLAS ROLLER CHAIN

Tortured and torn, in tests more rugged than any you would give it in normal use, Atlas Roller Chain gives daily proof on this Tensile Testing Machine of its super-strength. You know, before you buy it, that Atlas Chain has all the strength you'll ever need . . . to stand up and take it . . . year in and year out . . . under every operating condition.

The Tensile Tester is your guarantee that every Atlas Chain drive will deliver full rated horsepower. Result . . . your machine can run at full rated speeds, with consistently greater production and lower maintenance.

For maximum load-carrying ability and longer trouble-free life, install the chain with pre-tested strength.

Write today for the new Atlas Catalog and Handbook on roller chain. Atlas "Super-Life" Roller Chain is available through leading distributors everywhere.

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• Our business has been built on close, personal attention to the needs of our customers.

Sometimes it takes extra effort—overtime, special scheduling of work or even holding a machine idle for hours—to meet the time schedule or the specifications required. But if it can be done at all, our customers get the springs they need *when* they need them.

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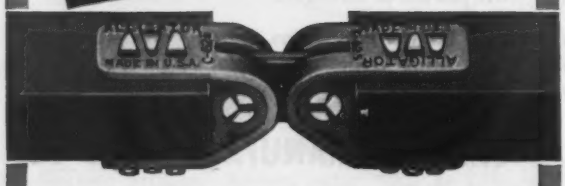
Precision Springs and Wire Forms

Now you can fasten V-belts by using

ALLIGATOR V-BELT FASTENERS



• Alligator V-Belt Fasteners and open-end (long length) V-belting in rolls will enable you to make up multiple V-belt drives for a wide variety of applications.

Available for B, C and D sizes of V-belting.

Not to be used for repairing endless cord V-belts.

Bulletin V-211 will give you complete details. A copy mailed on request.

Order from your supply house

FLEXIBLE STEEL LACING COMPANY

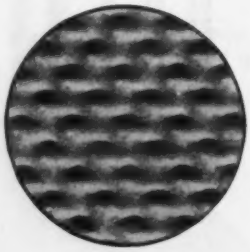
4642 Lexington St., Chicago 44, Illinois

Also sole manufacturers of Alligator Steel Belt Lacing for flat conveyor and transmission belts and FLEXCO Belt Fasteners and Rip Plates for fastening and repairing conveyor belts.

special facilities or equipment required. These materials were developed primarily for use with glass cloth reinforcing in such tooling applications as fabrication of jigs and fixtures, models, prototypes, molds, tool masters, etc. *For further information, circle key number on rip-out postcard.* Rezolin, Inc.

7

Wiper-upper



A clean, strong, safe, uniform, paper wiper is now available for industrial use packaged in a compact size box containing 125 wipers. Each wiper consists of two embossed sheets which are "welded" together for extra durability and chemically treated for wet strength. Product is a new approach to problems such as high unit cost, expensive handling, pilferage, etc. *For literature on these industrial wipers, circle key number on rip-out postcard and mail it to "Western Industry."* Scott Paper Co.

8

Microphone models for two-way radios

Three new microphone models now augment Motorola's line of two-way radio base station accessories. All three employ identical cartridges, smaller and more sensitive than those used in previous models. They are uni-directional dynamic microphones having a spring-suspended moving coil unit to prevent shock noises. Two are mounted on a desk stand and a third comes on a movable floating arm. *For additional information on this equipment, circle key number on rip-out postcard.* Motorola, Inc.

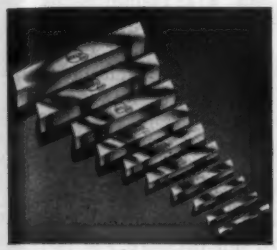
9

Lightweight gas meter rates with the best

A new lightweight die-cast aluminum gas meter, with a rated capacity of 415 cu. ft. per hour, weighs only 20 lbs. Meter has a single sealing flange between cover and body, and its valve plate is completely enclosed within its case. It also features oil-impregnated powdered metal bearings. Resistance to atmospheric corrosion is counted with its other features. *For additional facts and figures, circle key number on rip-out postcard.* Rockwell Manufacturing Co.

10

Bonus for bit users



Ground high speed steel tool bits, Besly-Bonus Bits, are available as finish ground bits in 10 sizes of squares from $\frac{3}{16}$ to one in., accurately ground to .001 in. for ease in alignment. Made from molybdenum-tungsten alloy, they are said to have excellent red hardness characteristics, resistance to abrasion and toughness. Bulletin TB-54 gives full information and prices. *Circle key number on rip-out postcard for your free copy.* Besly-Welles Corp.

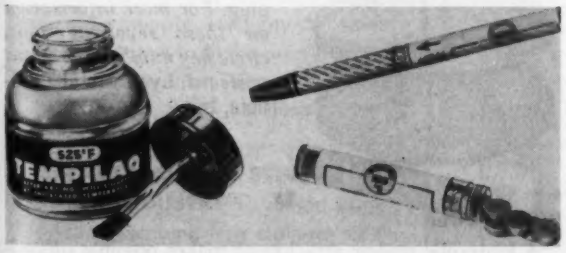
11

Wet-blast cabinets cut out costly hand cleaning methods

A machine that has no pump to wear (thus requiring little maintenance) and a more efficient blast gun seem to be the most outstanding features of this new Belmont Wet-Blast Cabinet. In a general picture, cabinet removes surface contamination and polishes with a water-suspension (slurry) of fine abrasive. It can be used for: aircraft engine maintenance; removing heat treat scale; improving cutting tool life; finishing dies and molds; wet-blasting before chrome plating; deburring; automotive and diesel repair; removing directional grinding lines; and general maintenance. *Circle key number on rip-out postcard for your copy of bulletin describing this piece of equipment.* Vacu-Blast Co., Inc.

12

Materials tell new degree of temperature



Tempilstiks°, Tempilaq°, and Tempil° Pellets are now developed to point of indicating 525 deg. F. Products are now ready in 12- or 13-deg. intervals from 113 deg. to 400 deg. F. and in 50-deg. intervals from 400 deg. to 2,000 deg. F. plus rating of 525 deg. F. *For more complete information on these indicators, circle key number on postcard and drop in nearest mailbox.* Tempil° Corp.

★ These accurate, compact, direct reading gauges—either as portable or permanent installations—have a wide application for measuring low range air and gas pressures.

They are designed so that the mercury cannot be lost from the gauge either through spilling or over-pressuring. They are available in the 3" and 6" sizes to measure 22 oz. and 48 oz. respectively. Unit scale graduations are in ounces. Each gauge is furnished complete with pet cock and necessary mercury.

Housings of the gauges are of cast semi-steel, accurately machined to insure leak-proof fitting of all the component parts. The housing, finished in dull black baked enamel, protects on three sides the heavy walled Pyrex, centrally located tube. Write for Bulletin 3 containing full details.

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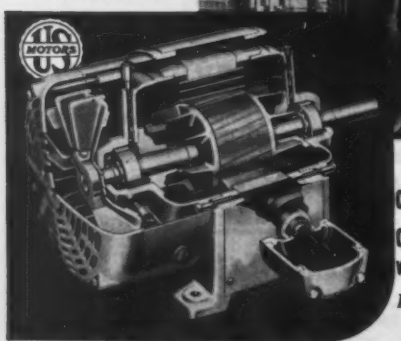

Class I—Group D
Class II—Groups F-G
with or without fan
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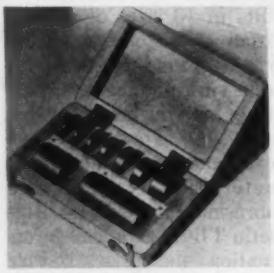
U.S. ELECTRICAL MOTORS, Inc.
BOX 2058, LOS ANGELES 54, CALIFORNIA MILFORD, CONN.

13

Swedish circular gauge blocks



Here is a standard nine-piece set which makes up into 331 combinations of 50 millionths accuracy. Because of circular construction and one inch diameter, they afford an increased gauging surface. When stacked for vertical dimensions, they present a rigid, well-balanced gauge which resists any normal amount of side pressure. *For further information, circle key number on rip-out postcard.* Transocean Trading Co.

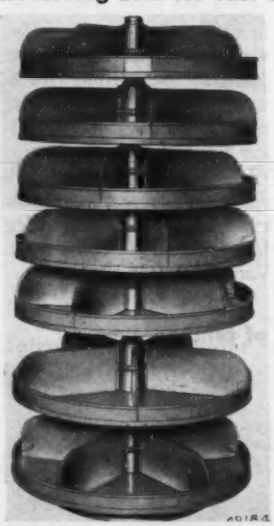
14

For loading and unloading

This unit is claimed ideal for loading and unloading freight, baggage cars or trucks. Available in 11-, 13-, and 15-in. sizes with ¾-hp. motor and 16-in. wide belt, motor has electrical controls for two-way operation. Unit can be raised by hydraulic jacks at either end. *For more information on this "double end belt booster," circle key number on rip-out postcard.* Harry J. Ferguson Co.

15

Revolving bins for fast action storage



These revolving bins are complete storage units, ideal for bulk stock, parts, nuts, bolts, screws, etc. Shelves revolve easily in either direction on ball bearing rollers. Each shelf has five permanent dividers and continuous labelholders. Shelves are stabilized to prevent sagging when unevenly loaded, and a broad base prevents tipping. *For more information on these revolving bins, circle key number on rip-out postcard.* Lyon Metal Products, Inc.

16

Pusher-offer

A hydraulic pusher attachment makes possible unloading by pusher action thus eliminating manual handling. It is particularly suitable for work in railroad box cars and highway trucks. Pusher is controlled by a lever conveniently located next to hoist and tilt levers. Pusher attachment may be attached or removed as required. *For more information on this pusher-offer, circle key number on rip-out postcard.* The Yale & Towne Manufacturing Co.

Yours for the asking...

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6. HOW TO GET THE RIGHT VALVE . . . Eight page folder giving information needed to enable manufacturer, supply company or sales representative to fit the proper valve for the application. Tells user or buyer how to get what he needs when ordering a valve.

7. CAST STAINLESS STEEL IN THE PAPER INDUSTRY . . . Eight page folder describing how stainless steel castings, valves and fittings are used to beat corrosion in the paper industry

CLIP THIS COUPON

8. THREADING STAINLESS STEEL . . . Four page folder describing specific high production machining operations on stainless steel valve parts. Speeds, cutting angles, coolants and tooling are discussed.

9. HIGH TEMPERATURE CHARACTERISTICS . . . Technical data chart giving high temperature characteristics of heat resistant alloys.

10. PROPERTIES OF CAST STAINLESS ALLOYS . . . Technical data chart giving designations, composition, mechanical and physical properties of cast stainless alloys.

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12. USES FOR CAST MONEL . . . Eight page booklet describing properties and applications of cast monel.

13. WHAT TYPE HIGH ALLOY CASTINGS . . . Four page folder describing selection of alloy types in keeping with government regulations.

14. QUIKUPL STAINLESS STEEL FITTING . . . Technical manual describing design, applications and limitations of revolutionary new type stainless fittings.

15. CATALOG #52 . . . Forty-eight page catalog describing complete line of Cooper Alloy stainless steel valves, fittings and accessories. Includes engineering drawings, weights, dimensions, size ranges, plus valuable material and corrosion data.

16. SHELL MOLDED STAINLESS CASTINGS . . . Eight page technical discussion explaining the development of a method for casting stainless steel in shell molds.

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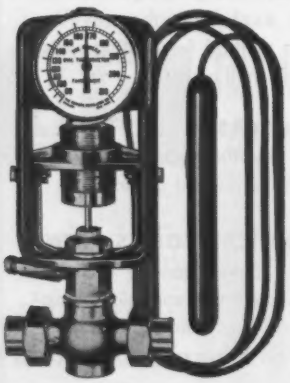

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REGULATOR
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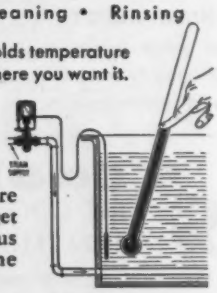

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Powers No. 11-MF Regulators are self-operating. They will help you get the most effective use from various solutions by holding them at the right temperature automatically.

Plastic Covered Thermal Bulb and Tubing—is highly resistant to solutions in above processes. Prevents electrical shorts. No insulators required for the regulator.

Easy to Read 4" Dial Thermometer—indicates temperature of liquid being controlled and makes it easy to adjust regulator for different temperatures.

Bulletin 330 describes this simple, dependable control. May we send you a copy? (b31)

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Offices in over 50 Cities, see your Phone Book • Established in 1891
PACIFIC COAST OFFICES:
Los Angeles 5, Calif., 1806 West 8th Street; Portland, Oregon; San Francisco, Calif.; Tacoma, Seattle 1, Washington, 2800 - 15th Ave. W.

17

Minute "Monolight" inspects tight spots

"Utility Monolight" is a featherweight, two-inch monochromatic light generator for inspection of flatness, finish and size with optical flats. With a base measuring 7 x 3½ in., this new Monolight is claimed ideal for use at production machines, production inspection stations, or for use by roving inspectors. It is designed for use directly on work surface of a machine tool or on a surface plate. *For additional information, circle key number on rip-out postcard.* The DoAll Co.

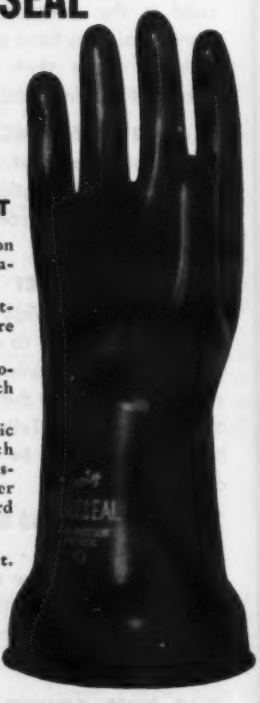
18

Aluminum comes to the aid of M-H

New portable gravity conveyor sections made of aluminum offer advantages in rugged construction, easy handling and rust resistance. Available in both wheel and roller sections, conveyor is said to mate perfectly with existing steel conveyors. These sections weight approximately half as much as comparable steel units of same size and capacity. Bulletin No. 18 gives complete details on this conveyor plus information on other equipment manufactured by same company. *For your copy, circle key number on rip-out postcard.* The E. W. Buschman Co.

SURETY'S SURESEAL INDUSTRIAL GLOVES

TURN-CUFF
OR
STANDARD GAUNTLET



- 10 Times higher abrasion resistance in standard abrasion tests.
- 4 Times higher snag resistance in standard puncture tests.
- Turn Cuff style with no-drip feature and 2-inch longer gauntlet.
- Surety's Sureseal synthetic rubber gives you much higher resistance to industrial chemicals than either natural rubber or standard synthetics.

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H. A. MAC INTOSH—Sales Representative
WESTERN DIVISION
544 MARKET STREET, SAN FRANCISCO 4, CALIF.

19

New Modine vertical delivery unit heaters

Modine Manufacturing Co. now offers a new and improved line of vertical delivery unit heaters for steam and hot water. Light weight is an outstanding feature of line. This adds much to ease of handling units during installation and to elimination of structural ceiling supports required for mounting heavier unit heaters. *For more information circle key number on rip-out postcard and send to us.*

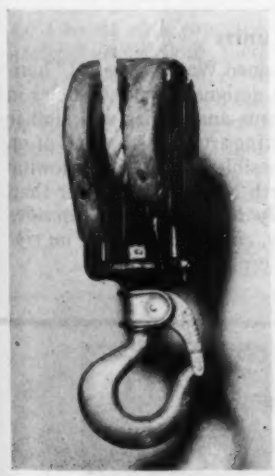
20

Pneumatic triplets

Three new Mall pneumatic impact wrenches offer capacity, power and size to meet individual needs, for tightening or removing bolts and nuts, for removing broken cap screws and studs. They do tapping, are claimed ideal for reaming and for driving and removing lag screws and screw spikes. *For specification data, circle key number on rip-out postcard and drop it in your outgoing basket.* Mall Tool Co.

21

Load hook features "safety pin"



A guaranteed safety feature of this new Bullard-Burnham safety hook is a safety gate which locks automatically and will not open unless pin is manually depressed. Addition of this safety gate to a new hook is said to make it literally impossible for any load to slip off. It will give added protection to men in numerous industries where derricks, hoists and cranes are used. *For a four-page catalog and data sheets listing all pertinent information concerning this safety hook, circle key number on rip-out postcard.* E. D. Bullard Co.

22

Good, fast protection for "green" concrete floors

An easy-to-apply sealer for newly-laid and repaired concrete floors will serve as a protective coating to prevent dusting and spalling. Sealer is also said to permit rise of residual moisture out of new concrete. A single coat, applied without prior acid treatments, is claimed quite sufficient to cover most new floors. One gallon of sealer covers from 400 to 600 sq. ft. *Circle key number on rip-out postcard for more information on this product.* West Disinfecting Co.

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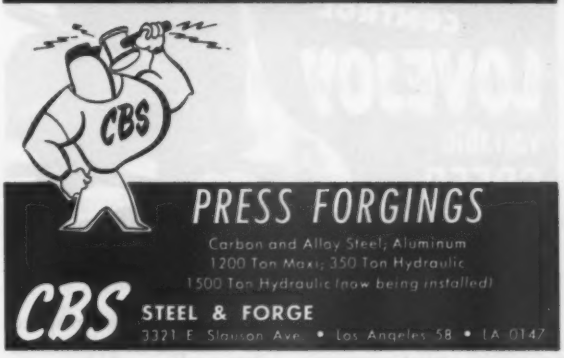
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1200 Ton Maxi; 350 Ton Hydraulic
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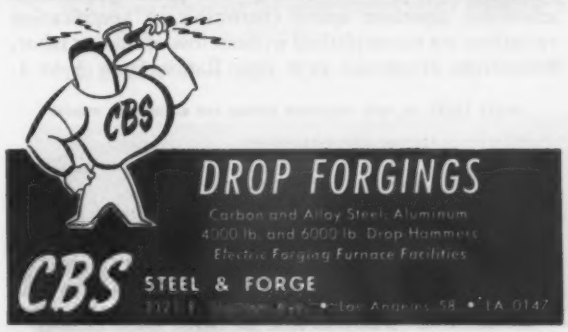

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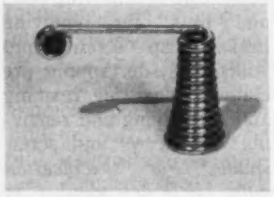
23

To keep metal cool at 5,000 deg.

A new thermal insulating material called "Pyrolock" protects metal against flame temperatures hotter than melting point of metals. *For more information on product, circle key number on rip-out postcard and mail to us postage free.* B. F. Goodrich Co.

24

For splicing electrical wiring



Two new sizes of "Scotchlok" electrical spring connector for making splices in electrical wiring are now available to industry. Types "L" (large) and "S" (small) are described by manufacturer as spring-type connectors that can't shake loose and require no tools. Listed by Underwriters Laboratories, this connector line should find usage for making splices in circuit wiring and for fixture hanging and appliance hook-up. *Circle key number on rip-out postcard for additional information.* Minnesota Mining and Manufacturing Co.

25

Horizontal hole punching units

New, independent, self-contained Wales Type "H" horizontal hole punching units are designed to punch holes in curved and straight flanges, rims and angles and similar shaped and formed work. Working from side instead of on top of flat surfaces is made possible by a design allowing punches to move back and forth horizontally rather than up and down. *Catalog H fully illustrates and describes these units. For your free copy, circle key number on rip-out postcard.* Wales-Strippit Corp.

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66° BAUME 20% OLEUM

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and special grades

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CHEMICAL & MFG. CORP.

26

Magnesium truck makes Materials Handling more efficient

A new, all-magnesium platform truck, for general materials handling use, is now offered in ten different models, each said to weigh ¼ to ⅓ as much as comparable equipment of similar size. All trucks in this series are capacity rated to handle loads up to 1,000 lbs. All parts are standard and replaceable. Handles are reversible, interchangeable, and can be replaced with special racks or superstructures for multi-purpose truck use. *For complete information on these trucks, circle key number on rip-out postcard.* Magline, Inc.

27

Abrasive belt sharpening method with refinements

There are now design refinements in original machine for sharpening carbide tipped tools by coated abrasive belts. Grinder is equipped with an automatic belt tensioning device and is fully guarded. Angle adjustment gauge now indicates relief angles up to 20 deg., and extensions are built onto table to accommodate offset tools. *Circle key number on rip-out postcard for information on improved sharpening method.* Behr-Manning Corp.

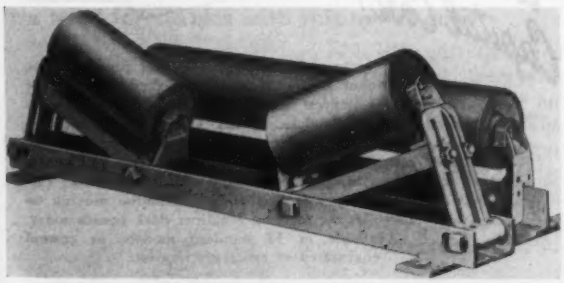
28

New units added to spur gear line

A grand total of 55 different models and sizes have been recently added to Coffing's line of spur gear hoists. Included are 15 sizes of single and multiple chain spur gear hoists with capacities from ¼ to 25 tons. For specialized applications, there now are plain and geared army type, low headroom, clevis connected, and extended hand wheel hoists. *Further information on complete hoist line is available to you by circling key number on rip-out postcard and dropping it in a mailbox.* Coffing Hoist Co.

29

For smooth belt transition



Here is a new variable troughing belt conveyor idler, designed to provide smooth belt transition between troughing idlers and flat pulley. Angle of inclination of concentrator rolls is adjustable from 20 deg. to fully horizontal, thus permitting a gradual flattening of belt as it approaches head pulley. Minimized stresses result in longer belt life. *For new 48-page book No. 2416, listing over 500 belt conveyor idlers in 34 types, circle key number on rip-out postcard and send it to us postage free.* Link-Belt Co.

Guarantee that has saved money for millions of users for 30 years

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THE RIDGE TOOL CO. • ELYRIA, OHIO

A place for everything and everything always in place. Drills, reamers, milling cutters, miscellaneous tools, bolts, screws, taps, discs, machine parts, etc. Speedy filing, storing and issuing are yours when you install:

BERGER MANUFACTURING DIVISION REPUBLIC STEEL CORPORATION

TOOL ROOM EQUIPMENT!

Standard shelving units may be purchased with special-purpose tool room units. Just select one or more in any grouping with shelves and dividers to suit your needs. They are adjustable both vertically and horizontally. Available for prompt delivery from local stocks.

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It takes only one man to safely and economically lift and spot heavy production materials with ElectroLift worm drive hoists. Smooth and fast moving, with either rope or push button control.

For details on speed, capacity and models, consult your ElectroLift representative listed in telephone directory.

ELECTROLIFT

ElectroLift, Inc.
30 Church St., New York 7, N. Y.

30

New warm air space heater

"Paraflo" is a new light oil fired warm-air heater recently added to Dravo Corp.'s line of space heating units. It is available in two models: Model 20 with 200,000 Btu. per hr. output and Model 25 with 250,000 Btu. per hr. output. Heater is equipped with an Underwriters Laboratories approved gun-type oil burner. It is a compact self-contained unit, factory assembled and flame tested before shipment. *To learn more details on this heater, circle key number on rip-out postcard.* Dravo Corp.

31

Exhaust purifier for safer indoor working

OCM catalytic exhaust, a device for removing carbon monoxide, fumes and odors from all types of gasoline-powered equipment, is said to permit safe indoor operation (including work in mines and tunnels) of gasoline engines. Now used on lift, dump and tow trucks, this fume-killing equipment is finding increased application to other gasoline powered equipment such as construction machinery. *For a folder telling about process and results, circle key number on rip-out postcard.* Oxy-Catalyst, Inc.

MULTIPLY LOADING CAPACITY

without Capital Cost!

Increase loading capacity over present levels, without adding a single new facility! Meet the demand for stepped up shipping and receiving flow by installing Magliner dock boards. Of all-magnesium construction, these low-cost units are easily handled by one man . . . capacity rated to handle the heaviest of loads and equipment! Establish a rapid transit bridge-link from freight carriers to plant—keep materials and merchandise moving on schedule! Get the facts on Magliner dock boards today. Available in 34 standard models, or custom engineered to exact specification.

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Magline Inc. • P. O. Box 402 • Pinconning, Michigan

W. T. Billard, Inc., Los Angeles; Equipment Supply Co., Salt Lake City, Utah; Hathaway-McCartney Engr. & Supply Co., Denver Colo.; Lift Truck Service Co., Spokane, Wash.; Material Handling Equip. Co., Inc., Seattle, Wash.; Oregon Handling Equip. Co., Portland, Ore.; Hamerslag Equip. Co., San Francisco.

32

Bifocal-wearing welders—attention

Improved vision for welders who wear bifocal glasses is said to be provided by a new device, Ortho-Weld magnifying lenses. Precision-molded of lucite, these lenses are made to fit all standard welding helmets. By inserting them between regular helmet filter lens and rear cover plate of lens holder, be-bifocaled welder is given comfortable close-up vision at any angle. *Descriptive literature, illustrating applications and giving a selection table may be obtained by circling key number on rip-out postcard and mailing it.* Bausch & Lomb Optical Co.

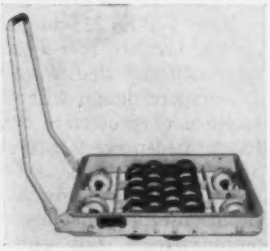
33

A fanner magnet to take the pinch out of sheet metal work

A new non-electric sheet fanner magnet that can be utilized in metal-working market is said to perform following operations: separate oily sheets without prying, lift polished or painted sheets without scratching; prevent double feed; provide safety for operators; handle irregular or odd shapes; protect dies; and speed up production. Fanner is available in four strengths and three sizes. *Circle key number on rip-out postcard for complete information.* Eriez Manufacturing Co.

34

No need for casters with this pallet dolly

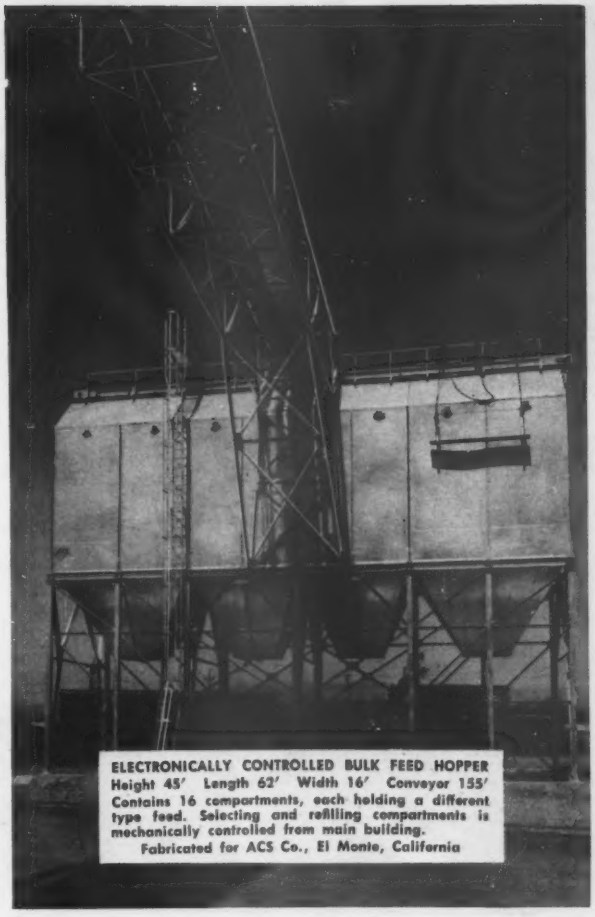


Roll Rite universal pallet dolly rolls and steers without swivel casters over any type floor. Maneuverability and ease of operation figure among advantages of this dolly which is well adapted to use in refrigerated cars and trucks. Engineering bulletin 310-40 gives complete details of construction and uses. *For your free copy, circle key number on rip-out postcard.* Roll Rite Corp.

35

Fire insulation for storage tanks

Propane and butane storage tanks above ground can now be effectively insulated against fire with B&W K-20 concrete mix. This fireproofing material is a lightweight in-



ELECTRONICALLY CONTROLLED BULK FEED HOPPER
Height 45' Length 62' Width 16' Conveyor 155'
Contains 16 compartments, each holding a different type feed. Selecting and refilling compartments is mechanically controlled from main building.
Fabricated for ACS Co., El Monte, California

Engineering in Steel

The bulk feed hopper illustrated above is not just another steel fabricating job . . . it required sound engineering! In addition to its normal exterior appearance it has many intricate parts partially described in the above specification. This is another example of how McDonough Steel Co. is helping all types of industry produce more efficiently.

Whether it's a Petro-Chem Heater for a refinery, a special piece of equipment for the food processing or chemical industry, or general fabricated plate work like stacks, breeching or ducts . . . we have engineering and manufacturing facilities to serve you.

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Quick-Opening "504" PIPE THREADER for Power Drive use

Threads 1" to 2" pipe with 1 set of dies

You can't beat this new "504" for fast smooth threading with power drive! Changes instantly from size to size regardless of position of quick-opening lever . . . Release ball handle, move indicator line to 1", 1¼", 1½" or 2" on size bar, tighten—it's ready to thread! Quick-opening handle retracts dies instantly without stopping power drive—no slow backing off. 4-jaw workholder centers pipe for accurate threading. No lead screw to jam. Easy-to-read size bar. Adjustable to over and under size threads. See it . . . try it . . . buy the new "504" at your Supply House.

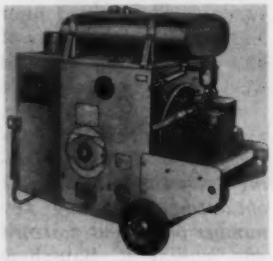
THE RIDGE TOOL COMPANY • ELYRIA, OHIO

RIDGID
Work-Saver Pipe Tools

sulating concrete of a kaolin base and a hydraulic setting cement binder. Applied to a thickness of 1½ in. on tank's outside, it is supported by steel car banding straps. *For more details on this insulation material, circle key number on rip-out postcard.* The Babcock & Wilcox Co.

36

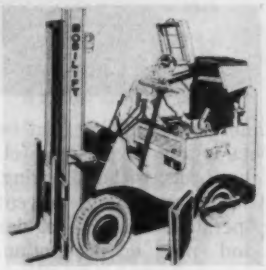
Big savings in fuel with this air heater



Redesigned standard model Herman Nelson portable air heater is now being powered with a new Briggs and Stratton Model 6 engine resulting in a simpler, cleaner arrangement of components at air intake end of heater. A fuel metering valve that can reduce unit's capacity to a low of 100,000 Btu's per hour permits saving on fuel at lower, frequently desired capacities. *For additional information, circle key number on rip-out postcard.* American Air Filter Co., Inc.

37

Mobilift reduces maintenance and service time



Maintenance and service time is reduced to a minimum on Mobilift D-424, by a one-piece hood which is hinged on counterweight and can be raised to give quick and easy access to engine compartment. Floor and toe boards are in sections that can be removed without tools. Lift truck has a 4,000-lb. capacity and is powered by a Chrysler six-cylinder, 65-bhp. industrial engine with a power transmission said to be an exclusive engineering feature of this new model. *Circle key number on rip-out postcard for more details.* Mobilift Corp.

38

"J" type circuit breaker saves mounting space

New I-T-E 225-ampere circuit breaker is claimed more compact than former 225-ampere design without sacrifice of protective features. Measuring 9 x 11 x 5½ in., "J" frame saves space in switchboards, distribution-type panelboards, power panels, bus plugs, combination motor starters, and individual enclosures. Reduced size allows double-butt mounting in convertible panelboards. *For additional details, circle key number on rip-out postcard.* I-T-E Circuit Breaker Co.

NEW MATERIALS AND EQUIPMENT IN BRIEF

39

Packaged preheater for smaller boilers

A packaged Ljungstrom unit, for preheating combustion air, can be entirely fabricated in your own plant. Unit requires only 100 to 250 manhours, depending on size, for erection. Designed for non-stoker-fired boilers in capacity range from 30,000 to 125,000 lbs. of steam per hour, it is intended primarily for boilers with operating pressures of 300 psi. or more. *For more information, circle key number on rip-out postcard and drop it in a mailbox.* Air Preheater Corp.

40

Play it safe with a subminiature warning light

A new subminiature indicator or warning light, for use on either standard or edge-lit panels, features wide-angle visibility plus sturdy construction with positive, large-area contact between base and lamp. Requiring only ½-in. depth behind panel, exclusive of contact, this lamp is known as Hetherington series L6000. Complete details are presented in bulletin L6000. *For your copy, circle key number on rip-out postcard and put into mail.* Hetherington, Inc.

41

Oven cuts processing time in half

Scientifically perfected for closely controlled production, a low-cost model Baronet industrial electric oven features temperature uniformity. Exact and thorough baking, drying, aging, curing or dehydrating is claimed to reduce operational time by 50% or more in many cases. *For literature on this oven, circle key number on rip-out postcard.* Baron Industries.

42

Everything for V-belts

For emergencies and when correct endless belt is not available, try a new Alligator V-belt drive unit. It contains Alligator open-end V-belting, fasteners and tools—everything needed to make up V-belts of any length. Replacement units contain belting and fasteners. Units are available for A, B, C and D drives. *For more information on units, circle key number on rip-out postcard.* Flexible Steel Lacing Co.

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3. For complete information on **PRODUCTS ADVERTISED** in this issue, fill in page number and name of advertiser.

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San Francisco 5, Calif.

43

"Thru-type" current transformer for indoor or outdoor service

Molded of thermo-setting resin, this "thru-type" current transformer, Type TWM, is so small, compact and lightweight that several may be installed in a standard meter installation case. Unit can be mounted in vertical, horizontal or inverted position, and its base can be rotated 90 deg. for greater mounting position. It has conventional accuracy for light burden metering. *Circle key number on rip-out postcard for more material on this product.* Allis-Chalmers Manufacturing Co.

44

Triple duty with single brake adjustment

As result of a complete redesign, a new single-adjustment AC brake (Type AK) combines three adjustments in one: spring compression to control torque; magnet travel to control total shoe clearance from wheel; and auxiliary screw adjustment to equalize shoe clearances. A visible indicator will tell your maintenance crew when and how much to readjust for brake wear. *For additional details, circle key number on rip-out postcard.* Westinghouse Electric Corp.

45

For fast, low-cost hard-surfacing

Sprayweld Process is a specialized metallizing method combining metal spraying and torch fusing for simplified, high speed application of hard surfacing alloy. This alloy, Metco-Weld H, is a patented chromium boride claimed a hard non-sparking, non-magnetic material which is resistant to wear and corrosion with a low coefficient of friction. Bulletin 53B describes technique and presents typical applications. *For your free copy, circle key number on rip-out postcard and send it in.* Metallizing Engineering Co., Inc.

46

"Root protection" flux for inert gas welding

Eutector Flux 569-I, a specially designed inert gas flux for stainless steels, prevents oxidation which tends to form during welding and post heating. Flux is said to improve flow of weld metal, thus requiring less weld metal per joint to produce strong, ductile and porous-free welds. Eutector Flux 569-I is easily removed. *For additional data, circle key number on rip-out postcard.* Eutectic Welding Alloys Corp.

HELPFUL LITERATURE

for the plant operator who wants to keep informed

47

Motor starters bulletin released

Allis-Chalmers Manufacturing Co. releases a 12-page bulletin featuring company's Type H starters which are built to control squirrel-cage, synchronous, wound rotor and multi-speed motors in ratings from 2,200 to 5,000 volts. Starters are available with air or oil contactors. How these contactors are made and how they operate is explained in this bulletin. 14B6410B

48

Handy reference for flooring specifications

Eight American Standard specifications for oxychloride composition flooring are now available in *Oxychlorides Cement Association, Inc.'s* new folder. A general rundown of this material, including description, advantages, and characteristics is accompanied by pictures of typical installations and a chart of load test results. Following this comes featured specification lineup which covers general types, special types, characteristics, and where to specify. 23-D

49

268 pages of radio and electronics

Allied Radio Corp. releases its 1954 general catalog listing over 20,000 items of radio and electronic parts and equipment. Special emphasis is placed on equipment for industrial maintenance, research and production requirements. Listings include fluorescent lighting units, lamps and accessories, communications-type receivers, phonographs and accessories, etc. 135

50

"X-ray Analysis—Three Way Tool of Industry" . . .

. . . is a new six-page folder from *North American Philips Co., Inc.* Text gives complete explanation of procedure used in production control and in laboratory applications in order that film-type diffraction, X-ray diffractometer and X-ray spectograph techniques may be understood. Illustrations include instruments, typical films and charts, and drawings which show difference in geometry and construction. Typical cases are cited.

51

Expansion joint bulletin for the asking

An illustrated eight-page bulletin describing Flexon line of expansion joints is a new release from *Flexonics Corp.* This publication presents all basic data necessary to proper selection and application of pipeline expansion joints. Highlights include a discussion of types of pipeline motion frequently encountered and methods of handling this motion. Complete specifications are given for low and high pressure units plus detailed information on special types of joints. 133

Circle key number on rip-out card for literature you want

52

Pocket-size reference on M-H trucks

Nutting Truck and Caster Co., Inc., now has a new "pocket" size booklet illustrating 32 different types of trucks for easier and safer materials handling. Specifications and descriptions of these trucks, to be had in numerous standard sizes, include pertinent product data plus how-to-use-it information. 53-S

53

How to find the "missing link"

The Thomas Laughlin Co. presents its improved catalog No. 150 covering industrial and marine hardware: safety clips, missing links, turnbuckles, hooks, sockets, thimbles, eye and ring bolts, shackles and swivels. New drawings and engineering data will increase its usefulness to buyers, sellers and users of wire rope, chain, and accessories. Book also lists Laughlin's new and exclusive products.

54

Weed killer with many uses in industry

CMU is said to offer new economies and efficiency in killing unwanted vegetation. A full color folder from *E. I. Du Pont de Nemours & Co. (Inc.)* will give you details on how CMU works, why it is economical, how to use it. Safety factors and advantages of product are mentioned.

55

Casters and wheels

Here is good stuff from *Hamerslag Equipment Co.* featuring Fairbanks line of casters and wheels. Specifications and pictures cover: aluminum finish steel casters for regular duty; bronze finish for medium duty; semi-steel truck casters; heavy duty steel casters; and truck caster wheels.

56

About a new clipper hook

A small specification sheet, put out by *Clipper Belt Lacer Co.,* features new, larger size clipper No. 7 belt hook. No. 7 hook is shown in a line drawing. Text emphasizes tests in which hooks demonstrate tremendous holding ability when properly applied. 56

57

Forging and casting conveyors

Here is a sheet, from *Industrial Engineering & Manufacturing Co., Inc.,* on firm's 500-F series industrial forg-

Wrap Out Rust with **NOX-RUST Vapor-Wrapper**

A V.C.I. material conforming to specification MIL-P-3420.

Also commercial grades available which cut packaging costs 50%. Call us for all types of wax, grease and oil rust preventives which meet other government specifications. Write for free catalog and samples of Vapor-Wrapper.

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ing and casting conveyors. Besides illustrations and specification chart on F models 506, 508, 510 and 512, full descriptions are given of motor drive, carriage and elevating mechanism, chain sprockets, and chain and flights.

58

"The Storage Battery, Its Fundamentals, Use and Maintenance" . . .

. . . now comes in a revised, up-to-date, 24-page edition. It describes, in non-technical language, how a battery operates and how to keep it performing at maximum efficiency throughout its life. Booklet is suitable for instruction of personnel associated with automotive storage batteries, including passenger car and truck drivers. *The Electric Storage Battery Co.*

59

For more holes per grind

Chicago-Latrobe releases its new general catalog displaying line of firm's Double Circle tools. In convenient 8½ x 10⅝-in. size, book boasts a flexible binding which makes it easy to use while telephoning. Body of catalog is indexed and contains 152 pages designed for quick reference. Technical data, specifications, description and engineering information are all included. 51

Circle key number on rip-out card for literature you want

60

Info bulletin ready on aluminum gravity conveyor

Speedway Conveyors, Inc., now offers a full information bulletin on its aluminum gravity conveyor introduced last May at Materials Handling Exposition. Bulletin is complete with photographs and detailed specifications of standard speedways aluminum conveyor models. Information for installation is also included.

61

Glance through a reference book of portable electric tools

Porter-Cable Machine Co. makes available 28 pages of 52 portable electric tools and kits with over 400 attachments for use in contracting, woodworking, industry and maintenance. Booklet clearly illustrates tools and their uses. It includes specifications and prices for electric saws, sanders, grinders, drills, planes, routers, shapers, hedge-shears, combo-tools, radial arms, blades, abrasive wheels, discs and tool accessories. 101

62

Electronic control bulletin

A 16-page bulletin describing firm's line of Free-Vane electronic controllers is newly published by *The Bristol Co.* Described are latest additions to series 500 line of instruments which are available as indicating or recording controllers for temperature, pressure, flow, liquid level, humidity, and time program. Information on control unit's frequency modulation principle, plus data on combinations of indicators or recording pens and control units available, examples of applications, and complete engineering specifications are contained in this illustrated booklet. B226

63

"Nickel Alloys in Railroad Equipment"

This revised booklet of 32 pages supersedes all previously published editions. It contains new illustrations and data on use of alloys to meet requirements of improved design and modern methods of manufacturing diesel-electric locomotives, electric locomotives, gas turbines, steam locomotives, passenger equipment, freight cars, and miscellaneous railroad applications. *The International Nickel Co., Inc.*

64

This may mean new life for your bookkeeping

A simple request will bring a folder, from *Remington Rand Inc.* to you, explaining how complete mechanized bookkeeping can be had at low cost. It mentions how each charge or credit can be entered simultaneously on all records with perfect agreement. It tells you how you can get away from month-end peak. AB 848

65

"Guide to the selection and use of Portable Space Heaters" . . .

. . . stresses SAFETY as being a major factor to consider when buying portable air heaters for temporary heating uses such as spot heating, equipment pre-heating and special applications. Its four-fold objective is stated as follows: to assist prospective buyers in wisest selection of portable heating equipment; to protect property from possible hazards of fire at-

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Here's proof . . .

BUTLER steel pallet racks store *twice as much* in the same space

Before . . .

Forty-eight pallets of groceries, arranged in three rows, were stored in this floor space. To get at a pallet of groceries in the center row, with a fork truck, it was necessary to move the neighboring pallet on the outside row.

After . . .

Installation of *Butler* pallet racks made it possible to store *twice as many* pallets—96 in all—in the *same* warehouse space. Butler pallet racks put 64 of these pallets within easy arm's reach of the order fillers. Any one of the 96 pallets can be moved with a fork truck *without disturbing* its neighbors.

You can save time and space by using Butler steel pallet racks in any warehouse where quick access to a variety of products is desirable. Butler materials handling engineers can help you solve your special warehousing problems. Write for full information, today!

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tending use of such equipment; to safeguard well being of workmen; to guide fire and accident prevention officials in evaluating relative safety of various types. *American Air Filter Co., Inc.*

66

A new design in N. V. Breezo ventilating

Buffalo Forge Co. offers a three-color, 12-page bulletin on its new "Diamond Jubilee" NV Breezo (design A) fan developed for quiet, efficient ventilating of commercial and industrial business places. Features, performance charts, dimension data for design A, and facts on fan selection and installation are all included plus information on fan accessories. 3865

67

Handy-Handler conveyor lit. presented

A folder on Belt Handy-Handler conveyor puts emphasis on this equipment's construction features and how they all tie in to help users cut costs and save man-hours. A few figures on handling capacities are included, and conveyor dimensions are presented in diagrammatic form. Brochure winds up with a note on two conveyor accessories, a hopper stand and a dolly. *The Belt Corp.* 5082

A General Appraisal provides the right answer to the question, "What's it worth?" for many vital business needs. It is especially useful for determination of insurable values for proper coverage, for positive proof of loss in event of fire or other loss, for financing, for allocation of costs for tax purposes, for sales, incorporations or mergers and many other uses. Consult the office nearest you for complete information.

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68

A guide to buy . . . conveyors for every M-H purpose

Belt, trolley, "universal" cable trolley, roller, package elevating, pusher bar, live roller, chain, bridge, apron, carousel and spiral conveyors—ALL are illustrated and described in this publication. Various types of specially engineered conveyor equipment pictured are said typical of wide scope of company's facilities for planning, designing, and building conveying machinery. *The E. W. Buschman Co.* 400

69

"Weld-Bilt" book on trucks

Here is a well done catalog on all kinds of two- and four-wheel Weld Built materials handling trucks. Pictures, text (including specifications), and, in some cases, diagrams, are presented to give you a good idea of each piece of equipment. *West Bend Equipment Corp.* 148

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70

Anti-squeak and gasketing ribbons are introduced

Technical data sheet, giving specifications, application methods and test results of new sealing ribbon EC-1202, is published by Adhesive & Coatings division, *Minnesota Mining & Manufacturing Co.* Tables give data on this synthetic rubber fabric-reinforced material and 13 sizes of ribbons available, from ¼ to 2 in. wide and 1/32 and 1/16 in. thick.

71

How to choose hardsurfacing material for arc welding

Lincoln Electric Co. publishes its new 2-page chart on hardsurfacing materials and new instructions on hardsurfacing fluxes in this 20-page manual on arc welding. Remaining material includes guide to Lincoln electrodes, and detailed discussions of their properties and application, and also a general "preface to arc weld surfacing." 466

72

Phosphorus production—new industry for Montana

Regional Study No. 4 (June 1953) of Bureau of Business and Economic Research, *Montana State University*, reports on Victor Chemical Works' elemental phosphorus plant at Silver

Bow, one of Montana's new industries after World War II. In 32 pages of text, discussion explores background of industry and area, reasons for selection of Silver Bow, and effect of plant employment on economy of area. Maxine Johnson, research associate, is author.

73

A complete cable accessories book for your reference

Anaconda Wire & Cable Co. has just published a new cable accessories catalog that is more complete than any other available up to now. It is actually a combination of sections 13 and 14 of company's general catalog. Book includes: pertinent information on potheads, filling compounds, paints and allied items, with discussion of firm's pothead features, application and installation data, etc. Second half of book is about joints, connectors, rolling tools, drawbenches, tie wire, armor rods, accessories for ACSR and steel ground wire, and allied items. C-79-13-14

74

Here's a bulletin on dust control in metal working

Particular attention is focused on use of high-efficiency cloth-tube-type dust collectors in ventilation of grinding and annealing operations, sprue mills, and blast cleaning equipment in a bulletin published by *American Wheelabrator & Equipment Corp.* Also, a section is devoted to cloth filtration in such hot operations as collection of foundry cupola fume. 392

75

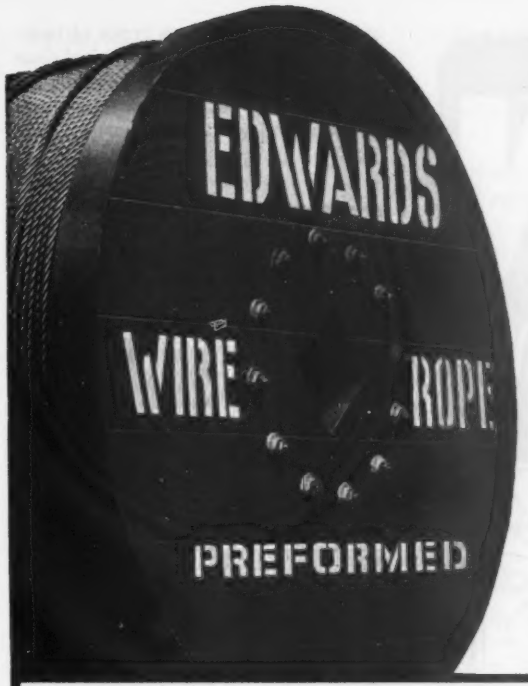
Cellulose acetate—properties and uses

A new edition of basic technical booklet on properties and uses of cellulose acetate is made available by *Hercules Powder Co.* Revised material includes data on many new solvents, plasticizers and resins used with cellulose acetate. Booklet also has new information about acetate specialty lacquers: starting formulas for clear and pigmented outdoor lacquers, heat-resistant paper lacquer, greaseproof wallpaper lacquer, plastic coatings, and dipping lacquers. Up-to-the-minute information.

76

Furnace and induction brazing

Story of how furnace and induction brazing reduces costs, increases production, and achieves higher quality is told by picture-story case-history technique in a new bulletin from *General Electric Co.* This 12-page, two-color booklet employs over 30 photographs



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to explain how various types of brazing have proven more economical than former processes. Examples include replacement of casting, forging, machining, and welding of parts. GEA-5889

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77

Gýrol Fluid Drive published for public

American Blower Corp. releases a new two-color, 24-page bulletin covering type VS, class 4 Gýrol fluid drive. Publication's attractive design permits rapid reading, and it covers such subjects as applications, advantages, features, selection and dimensions. Brochure will be valuable to engineers interested in obtaining adjustable speed operation in a range from 100 to 2,500 hp. 9319

78

"Electricity for Isolated Communities" . . .

. . . is title of a new eight-page booklet just produced by *Caterpillar Tractor Co.* Cat-built diesel-electric sets, providing power from 16 to 315 kilowatts, are shown operating in Union of South Africa, Alaska, etc. Story of how diesel electric sets may serve as inexpensive power opens booklet, and a chart on back cover lists all Caterpillar units available plus their kilowatt output. 30619

79

Hydraulic and pneumatic power system brochure

Fifteen applications of hydraulic and pneumatic power systems, representative of engineering and manufacturing services available from *The Rucker Co.*, are pictured and described in a new four-page brochure. Industries covered by these applications range from agricultural, canning and lumbering through automotive, aviation and marine to construction, chemical and metal working.

80

Info on sealing out rust

Useful information on sealing out rust wherever it occurs, a specialty of *Nox-Rust Chemical Corp.*, is contained in a new, easy-to-read folder now available to all maintenance men. It mentions some of many instances in an average factory where these permanent type rust preventives for metal are used both to prevent rust-formation on new surfaces, and stop spread of rust on old surfaces. Color chips are included.

81

Hand and motor winches

Here is up-to-date info. on winches, both hand and motor operated, from *Stephens-Adamson Mfg. Co.* Photos, measurement drawings and specification charts will give you a fine idea of several different styles. Folder winds up with a specification chart of standard 6 x 19 hoisting rope. 853

82

"Blue Book" on electric generating plants

D. W. Onan & Sons, Inc., issues a "Blue Book" of general information concerning selection of engine-driven electric generating plants. This pocket sized book traces history of electric plant development from early stages, where storage batteries were necessary, to today's single-unit, engine-generator power plants. Described in simple language are three general groups of electric plants: alternating current, direct current, and battery charging.

83

Vapor degreasing

A reference publication on vapor degreasing is released by *Currier Co., Inc.* Catalog gives information on degreasing and shows firm's standard sizes as well as low cost Drum Major line. Special degreasers designed for specific jobs are also included. Catalog is illustrated with typical units, and specifications are included.

84

How to prepare steel for painting

"How to Apply Better Zinc Phosphate Coatings to Steel in Preparation for Painting" is a 12-page booklet offered by *Oakite Products, Inc.*, describing recently developed Oakite CrysCoat HC process. It gives a concise, clear-cut explanation of problems involved in securing lasting paint adhesion on steel, and in protecting painted surfaces from electrochemical corrosion. Simplicity of new process is emphasized.

85

It pays to use unit heaters

Versatile nature of modern unit heaters is well illustrated in a new, twelve-page bulletin of photographs showing a wide scope of commercial, institutional and industrial heating installations. Unusual spot-heating applications are also included. It is designed to graphically assist designers

in solving heating problems by displaying solutions where comfort, economy and floor-saving have been accomplished. *Industrial Unit Heater Association.* 14

86

Gas welding and cutting equipment publication

Victor Equipment Co. publishes a new four-color 64-page, punched catalog covering firm's complete line of gas welding and cutting equipment. Illustrations include both four-color and black and white pictures. There are complete specification charts for full information and ease of ordering. 20

87

Gate valves

An informative and completely illustrated four-page circular, graphically describing its complete line of all-iron and iron body, bronze mounted King-clip gate valves, is published by *The Lunkenheimer Co.* Publication is produced in two colors and contains complete specification data and leading dimensions. 561

88

"15 Types of Fire Protection" . . .

. . . for extinguishing and controlling all types of fires are presented in *Rockwood Sprinkler Co.'s* 12-page, two-color booklet. Equipment and methods are both pictured and described, typical Rockwood sprinkler installations are shown, and firm's branch offices are listed for your convenience. Company offers to study your fire problems and make recommendations to meet your particular needs. 15T

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89

Selector aid for miniature ball bearings

A new 20-page bearing book published by *Miniature Precision Bearings, Inc.,* offers latest and most comprehensive design and application data on miniature ball bearings in sizes ranging from 0.100 in. OD to .375 in. OD. It contains data on all MPB products, including radial, angular contact, pivot and thrust bearings. A complete page, devoted to each bearing description, bears an identifying photograph, a scale drawing showing actual bearing sizes available, a load-speed graph and a dimension chart with cutaway drawings to identify legends. 3c/Mi

90

Booklet describes packaged drives

Packaged adjustable-voltage drives for variable speed applications are covered in a 16-page booklet available from *Westinghouse Electric Corp.* Brochure gives complete information about this adjustable voltage drive: construction and operation, typical applications, and economics of operation are discussed. Special operational characteristics that can be added to a standard package, inching, reversing, dynamic braking and multi-motor control are also noted. B-5808

91

Folder on compacting press

A recently released bulletin from *Baldwin-Lima-Hamilton Corp.* describes firm's Model "C," 100-ton powdered metal compacting press and lists its design specifications. A list of exclusive features faces a page of general dimensions which have been illustrated with line drawings. A large specification chart appears on last page of this two-color folder. 3101

Would You Like To See — How a Screw-Lift Will Handle Your Material Before You Purchase Equipment?

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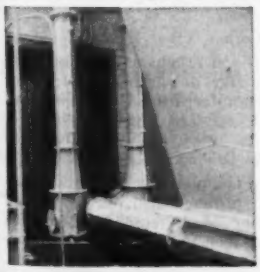

Showing Screw-Lifts mounted in tandem, receiving flour from hopper and conveying to processing department.

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CALIFORNIA

C. F. Butz Engineering

This Azusa, Calif. firm adds to its engineering staff: *Edward P. Moore,* formerly with Alvey Ferguson Co. of Cincinnati, Ohio; and *Gerald A. Salisbury,* formerly with Miller Brewing Co. of Milwaukee, Wis.

Tide Water Associated Oil Co.

Robert C. Hadden is promoted to newly created position of assistant manager of Crude Oil and Products department of concern's Western division. He was previously operating assistant of same department. He will headquarter in company's San Francisco offices.

The Liquid Carbonic Corp.

H. C. Mathey is elected a vice president and general manager of firm's Pacific division as well as president of Stuart Oxygen division. He will continue to headquarter in Los Angeles.

Northrop Aircraft, Inc.

G. A. Kelley is named manager of cost estimating department at Hawthorne. He was formerly a staff assistant in firm's customer relations division. *William L. Aldrich,* previously assistant industrial relations manager, becomes manager of industrial relations at Northrop Aircraft's Anaheim division.

Precision Investment Casting Co.

Robert D. Remington is named division manager of firm's Sintered Metal Parts division at Pasadena. He comes from Dayton, Ohio, where he was assistant general manager of Metal Powder Products, Inc.

R. D. Remington
Precision Investment

L. A. Johnson
Sterling Electric Motors

Sterling Electric Motors, Inc.

Leonard A. Johnson joins this Los Angeles company as comptroller. He was formerly associated with Hydro-Aire, Inc.

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Turco Products, Inc.

This Los Angeles company appoints Rear Admiral G. A. T. Washburn as its president's special assistant in charge of facilities.

Albers Milling Co.

Richard E. Hill is new staff assistant at Oakland Albers mill. He was previously assistant superintendent at Los Angeles mill.

Stockton Chamber of Commerce

Bruce Craver, formerly industrial manager of San Jose Chamber of Commerce, is named secretary-manager of Stockton Chamber of Commerce.

Roylyn Inc.

Harry Sandberg is named chief of planning and production control for this Glendale concern. *Clifford D. Frank* assumes duties of production manager. *Robert Field* becomes chief design engineer. He was previously associated with Bureau of Aeronautics in Washington, assigned to maintenance engineering of aircraft.

Hiller Helicopters

Firm at Palo Alto names *Robert A. Wagner* as chief engineer. *William C. Jordan,* executive vice president and general manager, takes a temporary leave of absence to do a special assignment for office of Secretary of Air Force. During his absence *Henry L. McIntyre* assumes chairmanship of firm's Executive committee.

Stanford Research Institute

John B. Shallenberger, industrial consultant and former training manager of Ford Motor Co.'s international division, joins Institute's economics division. Stanford, to take part in its international program and to participate in several development activities. Institute opens an office in Phoenix, Arizona to serve as headquarters for a study of Southwestern economic and development problems. *Beardsley Graham,* Institute's assistant director, will direct area operations, *C. L. Hamman,* market analyst, and *H. E. Robison,* economist, both from SRI's economics research division, will conduct area development surveys in new quarters.

The Garrett Corp.

Homer J. Wood resigns as assistant chief engineer in charge of turbo-machinery for AiResearch Manufacturing Co., division of The Garrett Corp., Los Angeles.

Thomas P. Pike Drilling Co.

Thomas P. Pike, president of this Los Angeles oilwell drilling firm, is appointed deputy director of Defense Department's newly created agency to coordinate supply and logistics for Armed Services. He is headquartering in Washington, D. C.

Consolidated Engineering Corp.

Victor J. Pollock, treasurer, is elected secretary-treasurer. He succeeds, as secretary, *James B. Christie,* resigned to devote more time to his law practice. *Walter B. Claus,* former chief mechanical engineer of this Pasadena instrument firm, is named director of manufacturing, and assistant head of division for newly re-organized Transducer

division with operations at 620 N. Lake Ave. Succeeding him, as chief mechanical engineer, is *Gerald S. Perkins,* previously assistant chief mechanical engineer.

State Water Pollution Control Board

A. M. Rawn, chief engineer and general manager, Los Angeles County Sanitation districts, is elected to Board chairmanship succeeding *General Warren T. Hannum,* retired State Director of Natural Resources.

Clayton Manufacturing Co.

El Monte firm elevates *E. S. Chapman,* vice president and general manager, to post of executive vice president in charge of all operations. *Perry Arant,* head of product engineering, is appointed vice president in charge of engineering.

Pomona Tile Manufacturing Co.

Ben-Allen Wooley is named personnel manager with offices in firm's factory at Pomona. He was formerly personnel director for an electronics manufacturer in Burbank. He replaces *S. R. Snyder,* resigned.

Levant Brush Co.

Harry D. Smith joins this brush and bristle goods manufacturing concern at Van Nuys as general manager. He was formerly associated with Century Metalcraft Corp. as production manager.

Douglas Aircraft Co.

K. G. Farrar is appointed general manager of Long Beach division. He previously held position of works manager, same division. He succeeds *James Simpson,* deceased.

Pacific Board Fabricators

This Los Angeles concern appoints *John R. Nunn* as vice president, general manager and director.

E. I. du Pont de Nemours & Co.

John F. Shaw, formerly West Coast district assistant manager of petroleum chemicals division, Los Angeles, is promoted to position of assistant manager of central district with headquarters in Chicago. He is succeeded by *William B. Gest,* former technical assistant to director of sales, Wilmington, Del.

Hughes Aircraft Co.

Culver City firm names *William C. Jordan* vice president and general manager. He was previously president of Curtiss-Wright Corp. and Wright Aeronautical Corp. He succeeds *Harold L. George,* recently resigned as general manager.

Western Oil & Gas Association

John M. Peirce resigns as vice president and general manager of Association at Los Angeles to become director of California State Finance Department.

San Francisco Iron Foundry Co.

Eldo Finley becomes general superintendent of this San Francisco concern.

Humboldt Plywood Corp.

R. E. Baker of Portland, Ore., is appointed vice president and director in charge of timber and log procurement for this Corporation at Arcata. He is former managing director of Columbia River Log Scaling bureau.

H. I. Thomson Fiber Glass Co.

William C. Winterhalter is named vice president and general manager of Los Angeles company. He has been vice president and general sales manager of Owens-Corning Fiberglas Corp's Pacific Coast division.

Solar Aircraft Co.

Rankin H. McDaniel is appointed assistant general production superintendent of this company's San Diego plant.

Continental Oil Co.

Olen Lane, Western regional general manager of this Houston concern, is elected a vice president. He will continue to headquarter in Los Angeles and serve Western area.

Triangle Steel & Supply Co.

Floyd Lewis joins Los Angeles firm as assistant general manager in charge of operations. He was formerly associated with Booz, Allen & Hamilton Co. as a consultant.

Southern California Edison Co.

H. W. Tice, vice president of this Los Angeles company, is elected vice president and general manager.

Hydro-Aire, Inc.

Richard M. Degen joins this Burbank aircraft accessories firm to take over newly created post of chief engineer. He comes from St. Louis, Missouri where he was associated with McDonnell Aircraft Corp.

R. M. Degen
Hydro-Aire, Inc.

C. W. Humphreys
Shell Chemical

Shell Chemical Corp.

Cecil W. Humphreys, formerly of Shell Chemical in Pittsburg, Martinez and Dominguez, Calif., is appointed concern's vice president in charge of manufacturing. *Arnold P. Howe* becomes Western division's chemical products manager.

Consolidated Vultee Aircraft Corp.

Formerly chief of production control for Convair's San Diego plant, *B. P. Gibbons* takes over newly created position of manager of material. *Paul G. Osborn* is promoted from post of superintendent to that of factory manager of Plant I. *T. F. McAleer III* is named chief of manufacturing control for Plant I. He was formerly assistant chief of manufacturing control.

Standard Oil Co. of California

John S. Detweiler of Standard Oil is appointed director of refining and natural gas for Petroleum Administration for Defense. He replaces *Paul E. Kuhl,* promoted to assistant deputy in charge of domestic oil. *L. L. Henning,* previously superintendent of Richmond refinery chemical division, is named manager of Standard Oil's Bakersfield refinery to succeed *M. M. Moore,* retired. Four changes take place in concern's Exploration department: *E. C. Doell* and *Antonie Paap* are both assigned to staff of chief geologist in San Francisco; *H. C. Bemis* goes to Southern district, Los Angeles,

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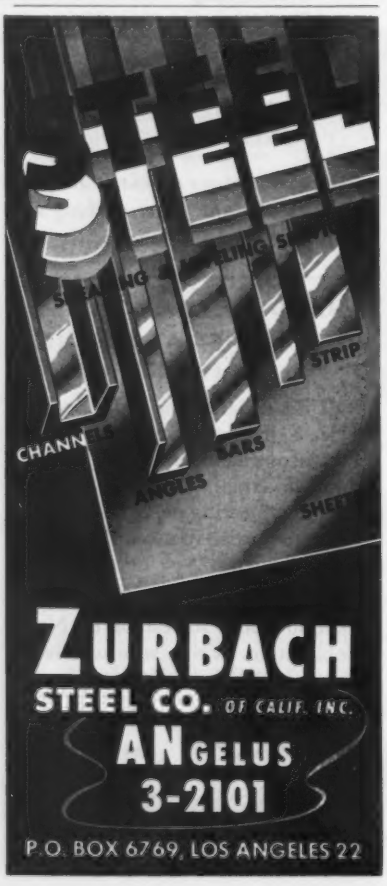

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as exploration superintendent; and *E. G. Dobrick, Jr.* becomes chief geophysicist, Oildale. *John H. Thacker* is elected a vice president of California Research Corp., Standard Oil subsidiary. He has been executive assistant to vice president specializing in problems connected with Naval Petroleum Reserve at Elk Hills.

Pastushin Aviation Corp.

Robert G. Gustavson joins firm's Engineering department as projects engineer in charge of jettisonable fuel tanks, external stores, and mechanism design. He was formerly supervisor in Structures section of North American Aviation, Inc.'s Engineering department, Inglewood. *T. C. Walston,* formerly of North American, also joins Pastushin's Engineering department where he will be responsible for preliminary design analysis. *Frank McGraw* comes from General Motors Corp. to take over as Pastushin's personnel director in charge of personnel, employment, and industrial relations activities.

Bone Engineering Corp.

This Glendale firm makes two additions to supervisory staff of its Investment Casting plant: *Joseph Glyman,* formerly of Misco Precision Casting Co., Whitehall and Detroit, Mich.; and *Henry Lanthier,* formerly with Kerr Manufacturing Co., Investment Casting division.

Westinghouse Electric Corp.

Charles H. Chance is named industrial relations manager for concern's Pacific Coast manufacturing plant, Sunnyvale, and of its Pacific Coast district, Manufacturing & Repair division. He comes from Pittsburgh where he was manager of industrial relations at Westinghouse Gearing division. He succeeds *B. H. Goodenough* who has been appointed assistant director of labor relations with headquarters in Pittsburgh.

General Electric Corp.

Maynard W. Johnson, plant superintendent at Oakland, becomes manager of concern's Distribution Transformer plant in Oakland. He succeeds *Paul R. Hartig* who is named manager of employee and plant community relations for G-E at Pittsfield, Mass. *Robert L. Brownlee,* formerly manager of engineering administration, Carboloy department, is named plant manager of Distribution Assemblies department of Industrial Power Components division, San Francisco.

California Packing Corp.

H. S. Erickson replaces *F. H. Laudenslager* as superintendent at company's Fruitdale plant.

Pacific Electric Manufacturing Corp.

Wesley R. Goldfine, formerly assistant to general superintendent at San Francisco plant, is now assistant to plant manager at firm's operations, Scranton, Pa. *A. M. Laws,* San Francisco general superintendent of plant operations, will have responsibility for general supervision of Scranton plant.

Mission Appliance Corp.

This Hawthorne concern promotes *Garnett Cumming* from production manager to general manager.

California-Pacific Utilities Co.

San Francisco company elects *E. E. Kime,* formerly vice president in charge of Eastern Oregon division, to position of vice president and treasurer. He succeeds *C. E. Bramble,* deceased. *E. K. Albert* is appointed executive vice president, and *D. J. Ley* becomes treasurer.

General Motors Corp.

Earl Hayward is named Los Angeles Fisher Body plant superintendent. Coming from St. Louis where he was superintendent of Fisher Body plant, he replaces *R. W. Newman,* now manager of Fisher Body's Tarrytown, N. Y. plant.

Phelps Dodge Copper Products Corp.

William H. Kent, formerly general superintendent of Tube division at Los Angeles, is named works manager. He replaces *Otto Klopsch,* transferred to Ft. Wayne, Ind. as works manager of Inca Manufacturing division.

General Paint Corp.

J. King becomes chief chemist of Los Angeles division succeeding *R. H. Andersen,* newly appointed technical director. *A. H. Cramer* is named production manager.

Rohr Aircraft Corp.

J. C. Felix joins firm as controller. He comes from Consolidated Vultee Aircraft Corp., where he held same position. Rohr makes these promotions for its new Riverside facility: vice president, administration, *A. F. Kitchen;* vice president engineering, *F. E. McCreery, Jr.;* vice president, manufacturing, *B. F. Raynes;* vice president and plant manager, *Charles E. Barnes. S. B. Houser* is upped from plant engineer to manager of facilities at Chula Vista and Riverside. *R. M. Ewbank,* formerly assistant production manager, takes over as production manager.

Menasco Manufacturing Co.

B. R. Fondren becomes vice president of finance; *Carl H. Kalbfleisch* is named vice president; *T. J. Tormey* takes over as assistant secretary; and *D. M. Lefmann* is made assistant treasurer for this Burbank firm.

Spreckels Sugar Co.

F. H. Ballou, Jr., is named vice president in charge of factory operations by San Francisco concern. He replaces *W. K. Gray,* deceased.

American Potash & Chemical Corp.

F. J. Lauten joins operations at Trona as senior process engineer in research department. He comes from New York where he was associated with Allied Chemical and Dye Corp.'s Solvay division.

Idaho-Maryland Mines Corp.

B. C. Austin is elected president and general manager to succeed *A. Crase,* resigned. Corporation's offices are in San Francisco, and its mines are in Grass Valley.

COLORADO

Fox Metal Products Corp.

Denver concern elects *O. C. Kinney* as executive vice president.

Colorado Fuel & Iron

Leonard C. Ford is appointed general mine foreman of this company's Allen mine.

Denver Research Institute

Dr. Jacob M. Schmidt, is named director of Institute's physics division, University of Denver. He will direct secret and semi-secret

defense research studies. He was formerly associated with A. O. Smith Corp. of Milwaukee, Wis.

C. A. Norgren Co.

Englewood manufacturing firm elects *C. Neil Norgren*, assistant general manager, to post of vice president and secretary. *Aksel Nielsen* becames vice president and assistant

C. N. Norgren *L. H. Norgren*
of C. A. Norgren Co.

treasurer. *Leigh H. Norgren*, plant superintendent, is elected treasurer and assistant secretary, and *Floyd R. Pool* is assistant secretary.

Newmont Mining Corp.

Kenneth L. Tatman, formerly mill superintendent at Resurrection Mining Co.'s Leadville mill, goes to Idorado Mining Co., Ouray, as a metallurgist. Both firms are operated by Newmont.

Denver Chamber of Commerce

Calvin K. Snyder, a former newspaperman of Washington, D. C., is named manager of Denver Chamber. *George E. Collisson*, who has been Chamber's secretary-manager, steps up to position of secretary.

MONTANA

Anaconda Copper Mining Co.

William D. Martin is appointed chief clerk at Anaconda Reduction department. He succeeds *Stuart Ainslie*, deceased.

Montana Power Co.

A. B. Martin, Butte mining engineer and chief engineer of Montana Power Co., resigns to accept position of research consultant with Washington Water Power Co., Spokane, Wash. He is succeeded by *H. E. Chambliss*, Montana Power's Great Falls division manager.

NEW MEXICO

New Mexico Manufacturers Assn.

Robert E. Filliettaz, Albuquerque, is appointed managing director for this association. He will continue as assistant director of United Brewers Foundation's New Mexico division.

OREGON

Union Fishermen's Co-operative Packing Co.

Rolf Ostrem of Seattle, Wash. is named manager of this Astoria company. He succeeds *Anton Sorensen*, retired.

Freightliner Corp.

J. Jolly is promoted to position of assistant to president of this Portland truck manufacturing firm. *E. Bartlow* is now in charge of branch operations, parts and service. *Verne Powels* is appointed assistant branch manager.

West Coast Lumbermen's Assn.

James G. Manning is appointed assistant manager of Association's Traffic department. He succeeds *Emil Hanson*, retired.

UTAH

Consulting Mining Engineer

Harlan A. Walker, formerly assistant manager of Homestake Mining Co., Lead, S.D., establishes headquarters as a consulting mining engineer at Salt Lake City.

WASHINGTON

Columbia River Paper Mills

Vancouver concern names *Cecil Taylor*, of Wausau, Wis., as its general superintendent. He succeeds *Dr. R. C. Crain*, resigned.

Pacific Car & Foundry Co.

E. A. Black becomes vice president in charge of marine division, heading Seattle firm's operations at Pier 66, Seattle; operations at Everett; and Winslow operations of Commercial Ship Repair Co. division. *Harold Woodman* is now superintendent of Winslow yard, and *J. L. Sweeting* is appointed general superintendent of Pier 66 and Winslow yards.

The National Plywood Distributors Assn.

Charles E. Devlin is named managing director of Tacoma association. He was formerly executive vice president of Northwest Door and Plywood Sales, Inc., Tacoma.

Port of Seattle

Port of Seattle Commission appoints *Howard M. Burke* Port's general manager. He has been with Rothschild International Stevedoring Co. as vice president.

ASSOCIATIONS ELECT

Rocky Mountain Oil and Gas Assn.:

President, W. W. Flenniken, Denver; vice president for Colorado, R. S. Shannon, Jr., Denver; vice president for Montana, W. M. Saxon, Billings, Mont.; vice president for Utah, J. L. Dougan, Salt Lake City; vice president for Idaho, C. L. Larson, Jr., Casper, Wyoming; and treasurer, H. A. True of Casper.

American Society of Mechanical Engineers, Utah section:

Chairman, Donald W. Newsome, Link-Belt Co.; vice-chairman, Julian M. Consley, Westinghouse Corp.; secretary treasurer, Donald L. King.

Southern California Assn. of Cabinet Manufacturers:

President, Paul A. Stember, sales manager of Hoffmeister Cabinet Co., Los Angeles; vice president, Paul B. Benson, Paul B. Benson Cabinet Co., Paramount, Calif.

American Mining Congress:

Chairman, Donald H. McLaughlin, San Francisco, president of Homestake Mining Co.

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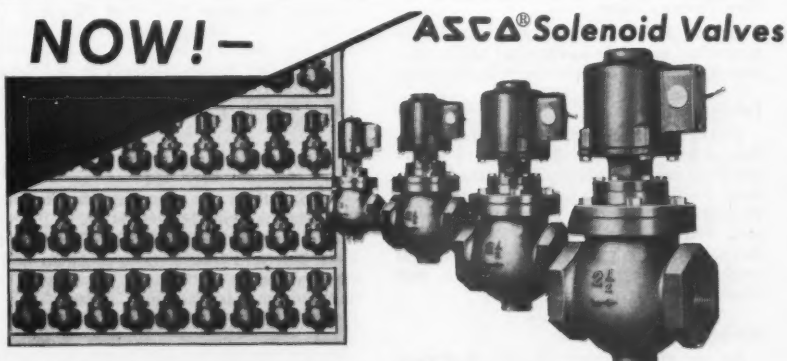

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Western TRADE WINDS

News about those who distribute and sell industrial equipment and materials

Heat and Control in Seattle

Charles B. Cole is named manager of newly opened Seattle office of Heat and Control, Inc., San Francisco, industrial process heating engineers. Cole is a graduate of University of Arizona in mining and metallurgy, and worked in that field with Phelps Dodge and smaller companies. He also has a master's degree in metallurgy from M.I.T. He served during the war with Army Ordnance and has since been associated with James H. Knapp Co. and North American Aircraft Corp.

Hamerslag news

Hamerslag Equipment Co. of San Francisco is appointed exclusive Northern California distributor for Mercury Manufacturing Co. of Chicago and will carry complete line of materials handling equipment. Industrial tractors, power lift trucks, trailers and skids are among equipment featured. Territory includes all of California north of San Luis Obispo, Kern and San Bernardino counties. Hamerslag also takes on distributorship in Northern California of industrial wheels and casters for Fairbanks Co., New York.

New Portland plant

Oregon Handling Equipment Co. begins operations in newly constructed plant, with over 4,000 sq. ft. of floor space, in Portland.

Enlarge territory

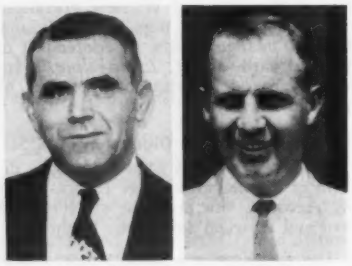
Plexolite Co. of Los Angeles transfers its Oregon and Idaho distributorship to Fiberglas Engineering & Supply Co. of the Northwest, Portland. Fiberglas has been handling Plexolite line in other areas of Northwest and, with its warehouses in Portland and Boise, will now make delivery from local stocks throughout this entire area and Alaska.

Bandoli heads sales team

As new vice president of sales, marketing and distribution for PROTO Tools, Los Angeles, Marvin S. Bandoli will coordinate sales, advertising and market research activities for PROTO Tools, Los Angeles; P & C Hand Forged Tool Co., Portland; and subsidiary companies in London, Ontario, and Schiller Park, Ill. Other recent appointments to assist in this program are: Clifford A. Faust, formerly advertising manager and now director of merchandising, advertising and promotion; H. W. Oetjen, formerly director of research and development and now sales manager of PROTO domestic sales; Manuel R. Calvo, formerly assistant export manager and now export manager in charge of Canadian and export sales; and Nelson E. Bartoo, formerly industrial sales specialist and now director of research and development.

At home in Fresno

Robert Phelps joins Kyle & Co. as manager of product development, Stran-Steel division, with headquarters at Fresno. He leaves post of California representative for California Wire Cloth division of Colorado Fuel & Iron Corp.



C. C. Buckley *R. Phelps of Kyle & Co.*

Charles C. Buckley is elected vice president in charge of engineering for Kyle, with offices also in Fresno. In his new position he will coordinate all engineering and estimating activities of company's Sacramento, Stockton and Fresno plants and serve as general manager of fabrication and production. Buckley has been with Kyle for 21 years and was formerly chief engineer at Fresno, a post now filled by James S. Anderson.

Three Western distributors

Libbey-Owens-Ford Glass Co., Toledo, names three new distributors in West for its insulating fiber glass: Industries Supply Co., San Diego; McPherson Furnace & Supply Co., Portland; and Reilly Atkinson & Co., Boise, Idaho. Industries Supply will cover San Diego and Imperial counties in California. McPherson will operate in Oregon. Atkinson will serve Southern Idaho and part of Eastern Oregon.

From Spokane to Seattle

New manager of Hyster Co.'s Seattle branch is Martin Larson, with company since 1951 as manager of Spokane branch. He replaces Fred Welch, now general manager of San Francisco office, and is succeeded at Spokane by Fred D. Robinson, formerly of A. H. Cox Co. Larson, who was previously with Modern Machinery Co., is a veteran in field of sales and engineering of construction equipment. Territory for Hyster Co.'s Seattle branch includes Washington, Northern Idaho and Western Montana.

Joins Butcher Co.

Horace Smith, formerly general foreman and chief chemist of plating department of Schlage Lock Co., San Francisco, becomes technical service man for L. H. Butcher Co., San Francisco.

Picks pioneer firm

Tay-Holbrook Inc., with headquarters in San Francisco, is appointed Northern California and Northern Nevada distributor of Chrysler Airtemp products. Firm, founded in 1848, which now has 12 branches in Oak-

More room for more sales

U. S. Rubber Co. opens new distributing branch and warehouse at Soto and East 46th St., Los Angeles, with 120,960 sq. ft. of floor space and docks for simultaneous loading of eight freight cars and fifteen trucks. Building provides sales offices and warehouse areas for U. S. tires, Fisk and Gillette tires, footwear and general products, wire and cable, and mechanical goods divisions of company. Area served includes Southern California, Arizona, New Mexico and portions of Utah and Colorado.

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land, Berkeley, Santa Rosa, San Carlos, San Jose, Salinas, Bakersfield, Fresno, Stockton, Sacramento, Eureka and Reno, will distribute complete line of Airtemp air conditioning, heating and refrigeration equipment.

New Masonite man in West

E. N. Tintelnot is promoted to assistant manager, industrial sales, for Masonite Corp.'s Western division, San Francisco, succeeding J. D. Hanauer, who has resigned to become general sales manager for Pacific Board Fabricators, Los Angeles. Tintelnot joined Masonite in 1948 as industrial salesman in Pittsburgh area and was transferred in 1951 to Fort Wayne-Indianapolis, Ind., territory where he has been until his recent move.

Weight-lifter

S. J. LeVato joins sales staff of Aro Equipment of California, Los Angeles, and will specialize in Globe industrial lifting equipment.

San Francisco branch

Branch office is established in San Francisco, to represent Cold Metal Products Co. of Calif., Los Angeles, and Cold Metal Products Co., Youngstown, Ohio. District sales manager is Thomas E. DeHart. Specialty strip steel will be supplied either from the Los Angeles warehouse or Youngstown mill, depending on quantity ordered.

Rocky Mountaineers

Allis-Chalmers Manufacturing Co., general machinery division, names Leland L. Mantel as sales representative for Denver district office and transfers Louis E. Lipphardt to similar post in Phoenix district office from Boston. Mantel, a mechanical engineering graduate of University of Southern California, joined Allis-Chalmers in 1951. Lipphardt has been with company since 1948. He is a graduate mechanical engineer of University of Maine.

New Clayton distributor

Garlinghouse Brothers, Los Angeles, distributor of construction equipment, adds complete line of Clayton steam generators, steam cleaners and hot water heaters in Southern California territory. Headquarters of Clayton Mfg. Company are in El Monte, Calif.

Republic Supply Co.

Buffalo Fire Appliance Corp. of Dayton, Ohio, appoints Republic Supply Co. of Los Angeles as its new distributor in Southern California. Complete line of Buffalo portable approved fire extinguishing equipment will be stocked.

60% bigger

Metallizing Engineering Co. puts into operation specially designed office and warehouse building in Los Angeles, which increases warehouse floor space by 60%. Building serves as headquarters for West Coast Manager Bertram Smith. Metco has also added a new sales office in Salt Lake City and enlarged its field engineer force to seven men who serve 14 states.

Kelite special consultant

A. C. Hillman, chemical engineer, is appointed special consultant by Kelite Products, Inc., Los Angeles, to give technical field service to users of Kelite metal finishing and processing products. He was formerly associated with General Chemical division of Allied Chemical and Dye Corp., M. W. Kellogg Co., and C. F. Braun Co. He is a graduate in chemical engineering from Columbia University.

Oregon general manager

C. L. Thompson, former assistant general manager of Buda Engine and Equipment Co., Inc.'s California branch, is promoted to post of Oregon branch general manager in Portland. His new duties will include planning and managing an expansion in this area, of sales and service of Buda diesel natural gas and gasoline engines, material handling equipment and railway supplies. His background includes association with aluminum extrusion and tubing industry, aluminum window and door business, and two years as business consultant and adviser to several Oregon firms.

C. L. Thompson
Buda Engine & Equipt.

S. E. Beal
Oakite Products, Inc.

Oakite picks Beal

New manager of Aviation division of Oakite Products, Inc., Los Angeles, is Samuel E. Beal. He joins firm after ten years of service with Douglas Aircraft Co. at Santa Monica, Calif., as chief chemist and then supervisor of chemical group. Oakite Products, with headquarters in New York, manufactures industrial cleaning materials and related products.

New marketing set-up for Standard Oil

Standard Oil Co. of California, San Francisco, reorganizes its home office marketing department to separate retail and wholesale sales. E. D. Thompson, formerly general manager of dealer sales, becomes general manager of all retail sales, which includes administrative work for Standard Stations, Inc., and sales to Chevron dealers. L. E. Hunt is associate general manager. Howard R. Cuyler continues as general sales manager-products, in charge of all wholesale selling. Changes do not affect operations of Standard Stations in the field.

Safetee north and south

Safetee Products Co., San Francisco, opens branch office in Seattle, to serve territory in Washington and Oregon. Territory manager, Arthur Johnson, will also be in charge of establishment of dealers in Alaska. To the south, Safetee appoints Westmark Co. of Pomona, Calif., as its distributor in the area from Bakersfield south to the state border.

Michigander comes West

Frank W. Walker is named regional sales manager for Motorola Communications & Electronics division, with offices in Los Angeles. He takes charge of newly created sales region made up of Southern California, Arizona and Southeastern Nevada. Walker has been with Motorola for five years and was formerly zone manager for the state of

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Michigan. His earlier experience includes ten years as chief communications engineer for Michigan State police and three years as chief engineer for Greyhound Corp., where he was responsible for design and installation of first cross-country bus radio network in country. He attended Tulane University and Armour Institute.

Foote Bros. open West Coast branch

A new branch office to provide sales and service in California is opened in Southgate, a Los Angeles suburb, by Foote Bros. Gear and Machine Corp., Chicago. Robert E. Utermohlen heads staff of new office, which will handle company's complete line of gears and speed reducers.

Robco handles English import

Robco, Inc., Maywood, Calif., is appointed distributor for Portapal hydraulic pallet lift truck imported from England.

Meters and valves

A. A. Fomilyant, Los Angeles district manager of Rockwell Manufacturing Co.'s Meter and Valve division, is named general manager of company's Macnick division at Tulsa, Okla. He is succeeded by E. M. Cloran, former Western regional supervisor of gas products sales. Cloran, a graduate in mechanical engineering from Harvard University, joined Rockwell in 1931, coming to the Pacific Coast Sales division in 1939. During the war he served with Navy's Bureau of Ordnance, followed by work as a research associate at USC and Cal Tech. He returned to Rockwell's Pacific Coast Region in 1950 as technical advisor and supervisor of gas products sales. Fomilyant joined Rockwell in 1938 as a sales engineer. From 1945 to 1947 he was a partner and general manager of All-American Fabricators in Los Angeles, and for the next two years was sales supervisor of Republic Supply Co. of Calif. Rejoining Rockwell as valve supervisor in 1949, he was named Los Angeles district manager in 1952.

New tags and a homecoming

Walter J. Maytham is designated manager of Pacific Coast region for Westinghouse Electric Corp., a change from title of Pacific Coast district manager which he has held since 1949. Former branches are now known as districts, retaining their present headquarters. Harold G. Rethmeyer, former San Francisco branch manager, becomes Central Pacific district manager; Stanley M. Johns, former Los Angeles manager, becomes South Pacific district manager; and Kendall L. Howe, former Seattle manager, becomes North Pacific district manager. Pacific Coast Region covers nine Western states, Alaska and Hawaiian Islands.

Gano R. Baker is appointed Pacific Coast district manager of Westinghouse Elevator division, with headquarters in San Francisco. Baker is not new to this part of the country; he served as Southern California manager of the Elevator division in Los Angeles until three years ago, when he was transferred to New York City as Eastern district sales manager. In his new position he succeeds Robert H. Wagner, who has been named general sales manager of the Elevator division in Jersey City. N. J.

W. J. Maytham
Westinghouse

E. Wachtel
E. Wachtel Co.

New line for Wachtel

Precision Castparts Corp., Portland, appoints Emil Wachtel, industrial design and production consultant, as its representative in Northern California, with offices in San Francisco. Wachtel was formerly business and sales manager for Allied Engineering and Manufacturing Co., Redwood City, and during World War II served as a consultant for Office of Secretary of War and Office of Emergency Management. He now heads his own firm, E. Wachtel Co., specializing in metal manufacturing representation.

Carboloy man

Richard J. Benefiel is named district representative for Carboloy department of General Electric Co. Benefiel, who recently completed sales training at Carboloy headquarters in Detroit, will have offices at C. W. Marwedel Co. in Oakland, and will cover Northern California, Oregon and Washington. He is a graduate of Michigan State College.

Warehouse in Los Angeles

New warehouse and sales office is opened in Los Angeles, by Quaker Rubber Corp., division of H. K. Porter Co., Inc., Philadelphia. James Joyner heads new branch. New facility permits better service and deliveries on Quaker line of rubber conveyor and transmission belting, hose, packing, and miscellaneous rubber products.

Downey plant takes over

Lindberg Engineering Co. transfers all sales functions for heat treating furnaces to its new plant at Downey, Calif. The McGowan Company will continue to handle sale of Lindberg melting furnaces. Robert Singrin, recently tranferred from Milwaukee, and George Prest will handle sales of heat-treating furnaces. Lindberg Engineering Co. has headquarters in Chicago.

Reliance expands technical service

Reliance Electric and Engineering Co., Cleveland, establishes a direct factory sales office in San Francisco, served by Walter A. Jensen, who transfers from firm's Buffalo, N. Y., sales office. He has been with Reliance since 1950, following graduation as a mechanical engineer from Cornell University, Ithaca, N. Y. San Francisco sales office will serve accounts in Northern and Central California and Northwest Nevada, including those formerly served through Fred G. Guthrie firm, San Francisco.

Perry Dudley, Jr., for past 15 months in Cleveland offices of company, moves to Los Angeles. He is a graduate in electrical engineering from Purdue University.

New assignments at Ziegler

Howard Alperin joins Ziegler Steel Service Corp., Los Angeles, as sales reperesentative covering southeast industrial area of Los Angeles and Orange County. He has been associated with Eastern steel warehouses since 1938. Edward Fisher, whom he replaces, is now covering Pasadena, El Monte and east through San Bernardino. Henry Jensen, formerly in charge of that territory, becomes superintendent of operations.

Fulton succeeds Galen

Crown Zellerbach Corp., San Francisco, names John M. Fulton administrative head of its purchasing department. He leaves post as president of subsidiary company, Pacific Coast Supply Co., which handles raw materials, supplies and equipment for pulp and paper mills. He succeeds D. J. Galen who is retiring from Crown Zellerbach, where he has been vice president of purchasing since 1951, after 45 years of service with company and its predecesors. Fulton plans to maintain purchasing headquarters for Crown-Zellerbach in Portland.

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THE West ON ITS WAY

NEW PLANTS, EXPANSIONS, NEW INDUSTRIES, PRODUCTION CONTRACTS, DEVELOPMENT PROJECTS, UTILIZATION OF RESOURCES

A QUICK GLIMPSE AT OUR FUTURE

Opening the way

"It is no wildcat scheme to drive a good tunnel under your continental divide," declares Ole Singstad, internationally famed tunnel expert currently looking over four possible sites for a highway toll tunnel under Colorado's continental divide.

Engineers have said the ideal site would have portals between 11,200 and 11,500 feet elevation, would be capable of serving two lanes of traffic and would not be more than 1½ miles in length.

Complete plans for the all-weather highway toll tunnel will go before the state legislature in January. Highway Engineer Mark U. Watrous predicted that the legislature would be willing to subsidize the tunnel if studies now under way show that toll charges would almost but not quite pay the bill.

Five proposed tunnel sites now are under exhaustive survey by two engineering firms, Howard, Needles, Tammen and Bergendoff of Kansas City, and Singstad and Baillie of New York.

Preliminary studies of the four proposed sites show the following:

The *Loveland Pioneer* bore—Highest portal, 11,236 ft.; length, 5,418 ft.; new construction west approach, 1.8 mi.; east approach, 1.7 mi.

Straight Creek — Highest portal, 11,240 ft.; length, 7,221 ft.; new construction west approach, 8.9 mi.; east approach, 2.7 mi.

Jones Pass—Highest portal, 10,980 ft.; length, 9,852 ft.; new construction west approach, 20.2 mi.; east approach, 4 mi.

Devil's Thumb — Highest portal, 11,228 ft.; length, 5,718 ft.; west approach, 13.6 mi.; east approach, 12.5 mi.

A fifth route, receiving heavy support in Gilpin County, would cross the divide under Rogers Pass, near James Peak. Its boosters believe it would be less than 11,000 ft. high, less than two mi. long and would join U. S. Highway 40 near Winter Park.

Consideration of such a tunnel is a significant step in what may become a general Western move to overcome its physical barriers. The ramifications of such a plan are many. This project would facilitate truck traffic, already a vital factor in Western materials handling of raw materials. Many of our communities are growing up without rail facilities and are never likely to have any.

The tunnel would also tend to strengthen the economic link between opposite sides of the Rockies by making transportation of goods easier and faster.

Electronics sparking

A prediction that the future growth of the electronics industry of the West may be "several times the growth in the rest of the country" came from General Electric executive J. Milton Lang, recently in Los Angeles for the dedication of the company's new Western electronic tube warehouse.

Crystal ball gazers

The general opinion of Western Business Forecast panel members is that the fourth quarter activity of their own industries will be at about the level of both last year's final quarter and the quarter just past.

The forecast, published by The Prudential Insurance Co. of America, varies with the type of industry. Most optimistic is the trade group, which is prepared for a level above both last quarter and the final quarter of 1952.

Most pessimistic are the manufacturing and construction groups, who expect their business to be below both time periods. Agriculture is expected to be lower than during the third quarter but will not fall as low as that of the fourth quarter last year.

The financial and service industries expect a level about equal to last year's and somewhat higher than the third quarter of this year.

Where will it come from?

Consumers in the West are going to buy about 5% more gasoline in 1954 than they did in 1953, forecast V. A. Bellman, vice president in charge of marketing for General Petroleum Corp.

He suggested that this probably would continue whether general business conditions are "good, bad or indifferent."

This increased gasoline demand, growing 5% each year, will mean that in 1963 Western oilmen are going to have to produce 63% more gasoline than they are producing today, Bellman said.

Chemical empire to be?

Chemical industry sales this year will gross about $17,000,000,000, according to William C. Foster, president of the Manufacturing Chemists Association.

While the size is impressive, it is the rate of growth in the industry that really sparks the imagination. Foster indicates that nearly 45% of today's chemical business is in products not even conceived 15 years ago.

Foster is particularly enthusiastic about the leading part being played by chemicals in the industrial expansion of the West. He says, "Some of my colleagues are convinced that by 1975 you people here in the West will have an industrial empire that is integrated with, but not entirely dependent upon, industry elsewhere."

A section of the November 1953 issue of WESTERN INDUSTRY—609 Mission Street, San Francisco 5, Calif.

PLANT AREA SWELLS—National Welding Equipment Co., San Francisco, adds over 16,000 sq. ft. of floor space through purchase of buildings and parking area adjacent to present facilities, shown here. About 10,000 sq. ft. will be added to shop, and the remainder to engineering and development departments, storage and display. Company states it needs increased area for expanding production in medical equipment division and a new operation of high pressure equipment.

ARIZONA

BUILD FREIGHT RAILROAD — San Manuel Arizona Railroad Co. is formed in Phoenix for construction of 23-mi. branch rail line from Hayden to Tiger, which will serve San Manuel Copper Corp.'s mine, mill and smelter development in southeastern Pinal County. Line, to be completed in 1955, will branch south from Southern Pacific Co.'s Arizona Eastern line. According to present plans, railroad will be used by diesel freights making three round trips per week.

RIVIERA COPPER CONTRACT—General Services Administration signs three-year contract with Riviera Mines Co., Phoenix, for 3,000,000 lb. of refined copper at 32¢ a pound, less differentials. Riviera, new company headed by W. L. Allison of Allison Steel Manufacturing Co., will mine ore from Christmas mine in Banner mining district of Gila County, where it has recently built a mill. Contract calls for production of 600,000 lb. this year and 1,200,000 lb. in each of next two years. An earlier contract for copper from this mine, held by Sam Knight Mining Lease, Inc., of Winkelman, terminated automatically when price controls were removed from copper, after about 1,150,000 lb. of 2,390,000 lb. called for in contract had been produced.

MOTOROLA DOUBLES PLANT—Contracts are awarded and work begins on construction of an addition to electronic research plant of Motorola Corp., Phoenix, which will double original facilities built in 1950. Kitchell-Phillips Contractors, Inc., Phoenix, will erect reinforced concrete structure, with a target date of January 1, 1954, and have employed Edwin L. Varney and Associates to prepare architectural plans. Building and equipment will cost about $750,000. About 300 additional people will be employed in enlarged plant.

CALIFORNIA

A-1 PLANT FOR A. A.—A. A. (Accuracy Assured) Metal Products, Inc., builds new 22,000 sq. ft. plant in Gardena for manufacturing aircraft parts. Company, which celebrates its 15th anniversary this year, employs over 100 people.

WESTERN CENTER FOR CENTRO—Centro Research Laboratories, Inc., open West Coast offices at San Carlos, headed by Howard E. Smith, director. Laboratories offer research service to industrial clients similar to that performed by Centro's Eastern headquarters at Briarcliff Manor, N. Y., such as chemical research in fields of paints, plastics, processing of vegetable oils and manufacture of synthetic resins. New laboratory may also enter fields of agricultural chemicals, mining problems and processes, and pulp and paper industry.

NEW ELECTRONIC DIVISION—Thermador Electrical Manufacturing Co., subsidiary of Norris-Thermador Corp., opens new electronic division in Los Angeles. Plant will manufacture transformers, motors, switches, thermostats and similar electrical equipment.

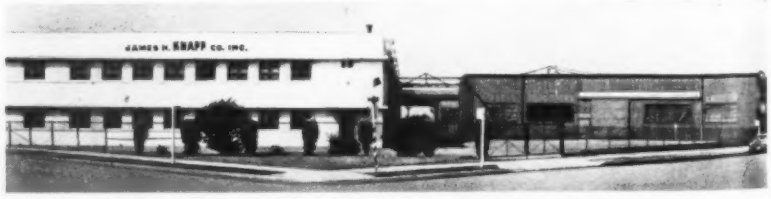
"EXPORT" CAT UNIT—Southwestern Engineering Co. of Los Angeles is awarded contract for approximately $3,000,000 to design and erect a "packaged" Thermofor catalytic cracking unit in refinery at Bay City, Mich., for Bay Refining Corp. of Saginaw, Mich. Contract calls for completion in fall of 1954 of catalytic cracking unit with a capacity of 6,000 bbl. per day and catalytic polymerization unit of 300 bbl. per day size plus auxiliary structures. This is third packaged TCC unit Southwestern Engineering has developed; first was installed at Artesia, N. M., and second at Potwin, Kansas. Process is licensed to Southwestern by Socony-Vacuum Oil Co.

NEW GENERATING PLANT — San Diego Gas and Electric Co. completes generating plant near Carlsbad. Plant occupies 110-acre location along shore and has capacity of over 400,000 kwh. electrical power.

CAINE ON THE ROAD—Caine Steel Co. of Calif., steel warehouse and metal fabricator, receives contract from State of California for steel guide posts, to be used along California's highways. Posts are being formed on one of Caine's new cold roll forming machines in Los Angeles plant.

EXPAND AT BAKERSFIELD — Richfield Oil Corp. will enlarge its Northern Division Headquarters near Bakersfield in construction designed by George Vernon Russell, AIA, and carried out by

KNAPP EXPANSION—James H. Knapp Co., designer and manufacturer of industrial furnaces, moves into new plant on 3½-acre site in Los Angeles, with 151,000 sq. ft. of operating area. Four concrete and steel buildings house shops and offices, supplemented by paved, fenced fabrication yards. Two 6-car railroad spurs and truck yards provide freight-handling facilities.



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David M. Biggar, Bakersfield contractor. Additional 40,000 sq. ft. of office space in an extension to administration building will house production and exploration department. Medical facilities and employees' canteen, lunch and meeting room will also be built.

FOURTH SINCE 1948—Bendix Aviation Corp. begins construction of new engineering building in North Hollywood, in fourth plant expansion at its Pacific Division since 1948. New building will be two stories high and provide about 23,000 sq. ft. of floor space for airborne radar and hydraulic engineering departments. To be completed in February 1954, it is first portion of planned engineering facility, and design allows for removal of entire back wall of building for future expansion.

NORTHROP LICENSE—Peerless Machine Co. of Los Angeles is licensed by Northrop Aircraft, Inc., to manufacture and market Northrop-developed swivel elbow fitting for high pressure fluid flow, as in jet aircraft fuel systems. Peerless will manufacture new swivel fitting at its main plant in Los Angeles.

TV TUBES—Sylvania Electric Products Inc. begins construction on 20-acre site in Fullerton of new television picture tube factory, to be completed in about seven months. Sylvania now has under construction an electronics plant in Mountain View and has awarded contracts for a second major electronics facility in Bay Area.

NEW LOCATION—Kortick Manufacturing Co., San Francisco, producer of pole line hardware, fasteners and iron and steel products, moves its office, plant and warehouse to 5600 Third St.

ATOMIC STUDY TEAM—Two West Coast companies participate in five-member Nuclear Power Group, with headquarters in Chicago, for industrial research and development of first nuclear power plant. Pacific Gas and Electric Co. and Bechtel Corp., both of San Francisco, worked together on earlier phase of research under AEC contract. Other three members are American Gas and Electric Service Corp., New York; Commonwealth Edison Co., Chicago; and Union Electric Co., St. Louis. Initial objective of group will be to select a reactor design for production of electric power. Costs of study will be borne by companies involved, and complete report will be submitted to AEC after one year.

JET ENGINE CONTRACT—A $1,000,000 contract for major components of General Electric J-47 jet engine is awarded Ryan Aeronautical Co., San Diego.

CHANGES AT COAST PRO-SEAL—Administrative and sales offices of Coast Pro-Seal and Mfg. Co., Los Angeles, move to 2235 Beverly Blvd. Company, formed July 1 in a merger of Aircraft Metal Forming Co. and Aero-Cal Engineers with Coast Paint and Chemical Co., reorganizes executive personnel. R. E. Meade, formerly executive vice president and general manager of Western Condensing Co. of San Francisco and Appleton, Wisc., is elected president and general manager. Walter W. Smith, formerly president of Coast Paint and Chemical, is named vice president and assistant general manager of new company. R. F. Baird, who was vice president and general manager of Aircraft Metal Forming Co., becomes vice president in charge of all manufacturing.

HAIL COLUMBIA—Columbia Industrial Services Corp., San Leandro, is organized and begins operations in San Leandro for reconditioning of steel drums and glazing of metal pans and trays used in bakery and food industry. Formerly Coast Drum Co., new $200,000 firm is backed by Gene Bozzolo and Robert W. Meyers.

TRANSFORMER PLANT—Electro Engineering Works, Oakland, buys site in San Leandro for construction of 20,000 sq. ft. plant, with estimated $250,000 investment in land, building and equipment. Over 60 persons will be employed in manufacture, sales and distribution of transformers for electronics industry and special applications. Company is owned by W. W. Wahlgren, technical director and original founder in 1937; W. Fry, business manager; and James J. Halloran, chief engineer.

NEW PACKARD-BELL PRODUCT—Packard-Bell Co., Los Angeles, begins production of room air conditioners. First models will be available for sale in eleven Western states and Hawaii in February 1954. Packard-Bell is a manufacturer of television and radio sets.

PLAN BAY AREA PLANT—Fabricating plant in San Francisco Bay Area will

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REA-LOCATION—J. B. Rea Co., Inc., moves to new plant in Santa Monica, Calif., which provides 22,000 sq. ft. of floor space and includes an analog and digital computing center said to be one of the most complete on West Coast. Rea, founded in 1951, designs and manufactures automatic control systems for military weapons and industrial processes.

be established around beginning of year by F. C. Russell Co., Cleveland, Ohio, manufacturer of metal windows, screens, awnings and doors. Company plans to lease building of approximately 20,000 sq. ft. area, with additional plant investment of between $500,000 and $600,000. About 200 people will be employed when plant begins production in early spring. Company, which now has eight other plants, is carrying out a decentralization policy and may later set up additional plant in Southern California.

BOX COMPANIES MERGE — Fleishhacker Paper Box Co. of San Francisco and Western Paper Box Co., which has two plants in Oakland, merge. All three plants will continue in operation, with no reduction in personnel.

JOINT EASTERN PLANT—Suncraft of California, Fresno, and Monson-California Co., Redwood City, plan joint factory at Fremont, Ohio, for production of redwood garden furniture and canvas goods for Eastern market.

NEW MILL NEAR REDLANDS—D. H. Rogers, Northern California logger, plans to build new lumber mill and planer near Redlands, to operate throughout the year, employ 40 to 50 men, and produce 50,000 ft. per day. Rogers was recently awarded a logging contract in Barton Flats area, the first in a program to control threatened pine beetle epidemic.

CLAY RESEARCH—Pacific Clay Products begins construction of $100,000 research laboratory at Los Nietos, to be completed around first of year. Building, to have an area of 7,500 sq. ft., will consolidate company's research activities on clay products and vitrified clay pipe. Meredith C. Brown, former director of research and development, is named vice president of research and development.

PEAT PLANT — Peat Manufacturing Co., Los Angeles, begins work on $200,000 plant in Norwalk which will house its offices and manufacturing operations, employing about 85 persons. Plant, scheduled for completion February 1, will have 29,000 sq. ft. area and will increase output by about 50%. Firm's operations are die casting of zinc and aluminum and molding of all plastics.

KOCH BUILDS NINTH PLANT—H. Koch & Sons, San Francisco, builds $750,000 plant in Corte Madera for manufacture of Fiberglas reinforced plastic luggage. Plant, to be in operation by end of January, will be company's ninth in Bay Area; two other plants are in San Francisco and six in Marin County.

ATOM SMASHER—Pacific Union College, Angwin, designs and builds half-million-volt ion accelerator for use in nuclear research. Dr. I. R. Neilsen, physics professor, is in charge of designing the "ion gun," patterned after installation at Oak Ridge, Tenn., and Walter Bollinger, physics instructor, is directing construction, to be completed next spring.

NEW BANKS—Bank of America begins $12,000,000 building improvement and construction program, to include 46 new buildings and to be completed within next 18 months. Following new building projects are now under way or to begin immediately: Merced, $420,000; Mountain View, $345,000; Wilshire-Vermont (Los Angeles), $300,000; Anaheim, $258,000; North Sacramento, $255,000; Santa Monica, $252,000; Stockton (east side), $250,000; and Redondo Beach, $244,000.

BUILD REFINERY—Douglas Oil Co. begins construction of 2,500-bbl.-per-day catalytic reforming unit at its Bakersfield refinery, scheduled for completion next February.

ATOMIC-POWERED PLANE — Lockheed Aircraft Corp., Burbank, is working on preliminary design study for nuclear-powered aircraft under Air Force contract. Lockheed is third major airframe company to work on such a project; Convair in San Diego has been engaged in similar work for two years, with General Electric Co. designated as builder of nuclear engine, and Boeing Aircraft, Seattle, also holds a contract, with Pratt & Whitney as engine builder.

VEGETABLE OIL PLANT—New vegetable oils processing plant of Archer-Daniels-Midland Co. is opened in Los Angeles. Located in new central manufacturing district, plant has five buildings: a 3-story unit for processing chemically modified oils, two buildings for production of oleo-resinous varnishes, a warehouse and a laboratory and office building.

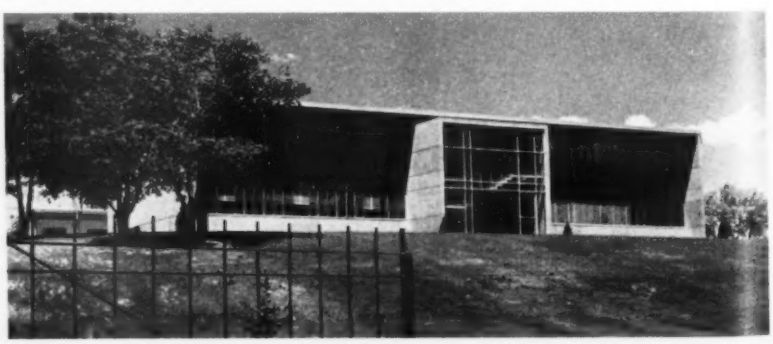
NEW MATERIAL — Holbrook-Merrill Co., San Francisco, is appointed Northern California fabricator of "Boltaron 6200," new, rigid, non-plasticized polyvinal chloride, by Horace Blackman Co. Holbrook-Merrill is a custom fabricator of sheet metal products.

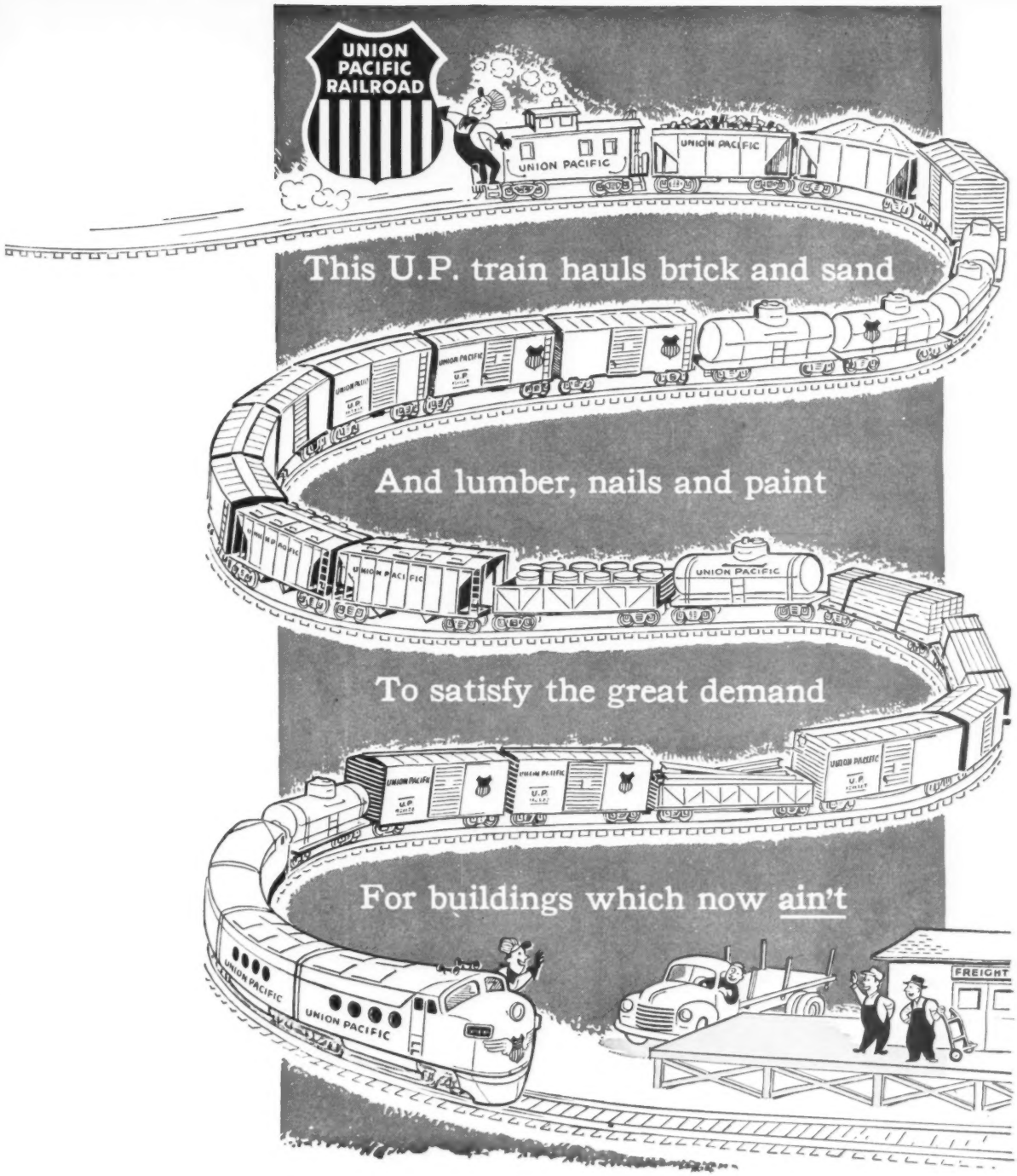
COLORADO

POWER PLANT FOR DENVER—Public Service Co. of Colorado begins construction of $17,000,000 generating unit in Denver, to be completed by July 1955, adding 100,000 kw. to capacity of Arapahoe power plant, an increase of 80%. New building, constructed as an extension of Arapahoe plant, will be 110 ft. high, 96 ft. long, and 220 ft. deep. Another generating unit, still in planning stage, will be built at an undisclosed site in Denver for completion in 1957.

AIRCRAFT COMPONENTS — Stanley Aviation Corp. of Buffalo, N. Y., will establish $500,000 plant for manufacture of aircraft component parts in Denver, near Stapleton Airfield. About 350 workers will reportedly be employed in plant, which will have 50,000 sq. ft. of floor space.

IDEAL RESEARCH CENTER—New laboratory and research center at Boettcher of Ideal Cement Co., Denver, consists of this two-story concrete building, which provides 8,300 sq. ft. of floor space, and adjoining service buildings, built at a cost of nearly a half million dollars. Center will serve all thirteen plants of company, from Gulf region to Pacific Coast. Research activities include raw materials analysis, quality control of cement production, development of new products and testing finished products. Director of Research is George C. Wilsnack; assistant to the director, Kenneth E. Palmer; and laboratory manager, Harold E. Hosticka.





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SHALE OIL PROCESS—Sinclair Oil Co. succeeds in producing shale oil through "controlled underground combustion" process, in experimentation at a site on Haystack Mountain west of Rifle. Process, which traps and distills gas fumes from shale burning underground, is said to produce oil at less cost than drilling for petroleum. More tests are required for development of commercial set-up, and they will be resumed next spring after snow melts. Sinclair owns 7,500 acres of oil-shale land in Western Colorado.

MAY ADD NEW PRODUCTS—Triplex Corp. of America, Pueblo, producer of aluminum pistons, may expand its manufacturing to include a variety of automobile parts. A possible addition may be aluminum permanent molding for truck industry, particularly large diesel units.

MONTANA

ANACONDA PROJECTS — Anaconda Wire & Cable Co. plans to build rolling mill for production of sheet aluminum at Great Falls, in addition to its new aluminum rod and wire mill. Structural steel work on Anaconda Aluminum Co.'s new plant at Columbia Falls is expected to be completed in late November by Vinnell Co., Inc., Los Angeles, contractor for steel work on first six permanent buildings. Enclosure of buildings with corrugated sheet metal siding has begun, to permit progress of work during winter. American Bridge Co. has contract to furnish and erect steel in four 1,140-ft.-long potline buildings, with work to begin early next year.

PLAN NEW PIPELINE—Williston Basin Pipeline, Inc., Billings, plans $7,000,000 pipeline to transport finished petroleum products from Billings-Laurel refining area to terminal in Glendive. Refiners to be served by 8-in. line are Farmers Union Central Exchange, Carter Oil Co., and Continental Oil Co. Completion is scheduled for early summer of 1954.

NEVADA

ADD SECOND SHIFT — Nevada Air Products Co., Reno subcontractor for Douglas Aircraft Co., begins training and up-grading of present personnel to permit two-shift operation by January 1, 1954, without importing additional skilled labor. Double shift will be employed in order to meet completion dates of current contracts, which extend over the next 2½ years.

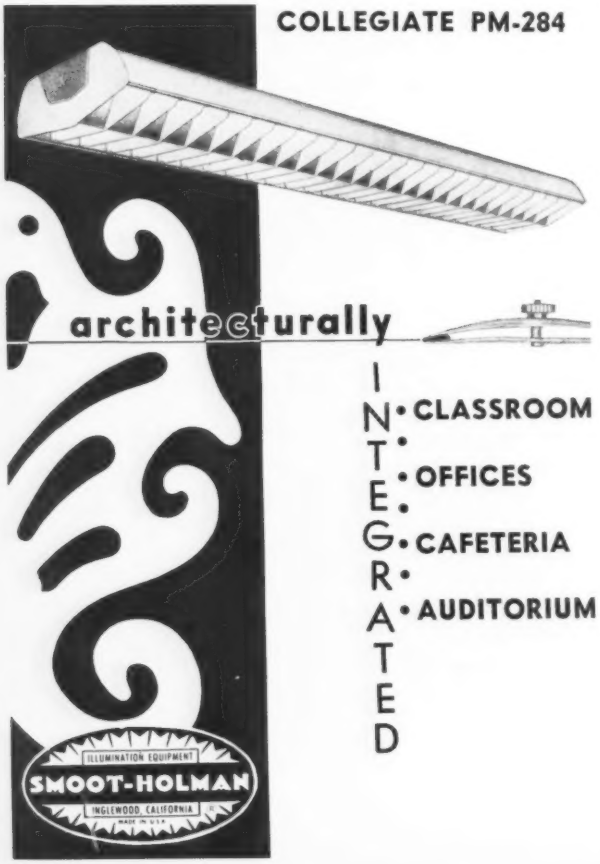
ATOMIC POWER STUDY — Senator George Malone (R., Nev.) makes public a letter from Walter Kidde Nuclear Laboratories, Inc., Garden City, N. Y., stating that firm, which holds contract with AEC for cost analysis of nuclear power plant, is considering siting plant near Eurkea. Contract specifies design study shall be for power plant of 30,000 kw. capacity in an isolated high cost power area.

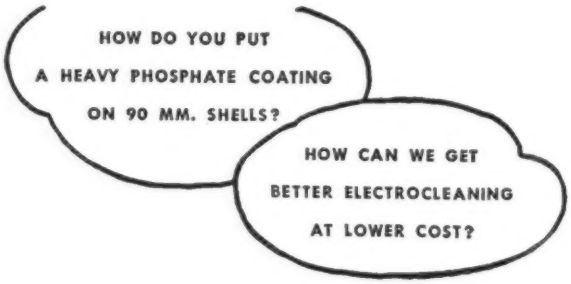
URANIUM EXPLORATION—Uranium Metals, Inc., Denver, is reported to have leased claims in Kings River district of Humboldt County and moved camp equipment, mining machinery and timber for uranium exploration team. Roy F. Roseberry of Elko will be mine superintendent and George DeLong mine foreman. Company has uranium-vanadium operations in Utah and Colorado.

NEW MEXICO

CLOSE ZINC-LEAD MINES AND MILLS—United States Smelting, Refining & Mining Co. suspends all mining and milling operations at its Bayard division in Silver City district, which employed about 200 workers. Two companies are still in production in Silver City area: Chino Mines Division of Kennecott Copper Corp., producing copper at Santa Rita and Hurley; and Luck Mining & Construction Co., producing manganese at its Boston Hill mine.

SAN JUAN DISCOVERY—El Paso Natural Gas Co. discovers new gas well in San Juan Basin which may indicate reserves in eastern part of basin double those previously known. This producing area is involved in application of Pacific Northwest Pipeline Co. before Federal Power Commission to build pipeline to supply natural gas to Pacific Northwest.





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OREGON

NEW PACKAGING PLANT—Quaker State Oil Refining Corp. builds new oil packaging plant in Portland located on Willamette River at Municipal Terminal No. 4. C. M. Corkum Co., Portland, is general contractor for structure, which was designed by J. Donald Kroeker and Assoc. of Portland. New plant will be in operation by April 1954, with storage capacity of 750,000 gal., and daily output of 25,000 gal. of motor oil in quart cans, plus products in larger containers. Plant investment will reportedly be $250,000.

WHITE MOTOR CO. BRANCH—White Motor Co. buys 209,000 sq. ft. of property in Guilds Lake industrial area of Portland for construction of factory branch and service station, representing $700,000 investment. Company's standard design will be used for one-story building containing 40,000 to 50,000 sq. ft. New plant will serve as parts distribution center for five-state area.

20-YEAR CONTRACTS—Secretary of Interior Douglas McKay approves 20-year contracts with four private utilities in Northwest for purchase of power from Bonneville Power Administration: Pacific Power & Light Co., Portland; Washington Water Power Co., Spokane; Mountain States Power Co., Albany, Ore. and Portland General Electric Co., Portland. Contracts with other private utilities are under study or being negotiated. Private utilities are now given increased long term firm power allotment after needs of public agencies and present industrial customers are supplied. A single new industry is limited to a power load of 10,000 kw.

MARKET AUTOMATIC TONG—New firm in Portland, Automatic Tong Co., begins production of automatic tong for use in log loading operations. Tradenamed "Second Loader Automatic Tong," device, which sets and loosens by itself, eliminates dangerous manually performed second-loader function. Inventor is Ernest Eckstine of Elgin.

CONTROL AUTO EXHAUST—H. R. Gallun, Salem inventor, begins making and marketing a limited number of devices which he claims eliminate carbon monoxide from automobile exhaust gas. A small air valve attached to intake manifold lifts electrically whenever engine decelerates, shutting off flow of gasoline from carburetor and providing free supply of air, thus eliminating vacuum. No partially burned gasoline is pumped through engine during deceleration; no oil is sucked out of oil pan; and no sludge is left in cylinder to foul the spark plugs and dirty the oil. Gasoline consumption is reduced and almost no carbon monoxide goes out with exhaust. Device costs $47.50 installed on passenger cars and $75 on trucks.

CONDITIONAL OK — Federal Power Commission issues 50-year license to California Oregon Power Co. for its projected $9,000,000 project on Klamath River, with stipulation that before construction begins company must obtain guarantee from Interior Dept. that it can use water stored upstream after 1967 by government reclamation dam. Company has one year to reach agreement with Interior Dept., which is said to oppose the hydroelectric project on ground that Klamath River water is needed for reclamation. Copco's project would include a diversion dam, tunnel, and powerhouse containing two 25,000-kw. generators.

COPPER FOR JAPAN—Production is scheduled to begin this month from reopened Queen of Bronze mine near Takilma, under contract between mine owner, Waite Minerals, Inc., and North American Mineral & Metal Corp. and its affiliate, Nippon Mining Co. Estimated production of 30,000 tons of ore and concentrates in next two years will be shipped to Nippon Mining Co., Japan. First operations will be leaching of dump materials; meanwhile underground mine will be reopened and diamond drilling undertaken to prospect another part of property. Mine was last worked in 1910.

HIGH BID—Vern Johnston Log Co., Medford, is high bidder for 9,900,000 board feet of timber sold by Umpqua National Forest, Roseburg, for $171,-997.50. Appraised value was $132,000.

PROUTY MILL CLOSED—Prouty Lumber and Box Co. shuts down its Warrenton sawmill due to increasing scarcity of logs and depressed lumber market. Planing mill is to continue for a few weeks longer, and shipment of lumber on hand at least through November. Shut-down affects about 190 employees.

UTAH

USE SHELL MOLDING—Wasatch Ball Foundry, Inc., Salt Lake City, installs shell molding device said to be first used in Intermountain West. Company, which produces rough cast steel balls for ball mills, claims to have doubled production with one-third less labor costs.

PLANS MATURE—Utah Chemical Co., a Utah corporation headed by Nicholas G. Morgan, Jr., Salt Lake City, advances planning of $23,500,000 chemical plant to be built in south-central Utah, which will use natural gas from Clear Creek field. Present goal is to start construction early in 1954 and to be in operation by fall of 1955. Financing arrangements are reportedly near completion, and long-term contracts for purchase of plant's output have been negotiated. Chemicals to be produced are urea, ammonia nitrate, anhydrous ammonia and nitric acid.

WASHINGTON

G.E. PROPOSAL—General Electric Co., Richland, reports it will recommend to Atomic Energy Commission that company be permitted to proceed with development and design, followed by construction and operation within five years, of dual purpose reactor at Hanford, to produce both plutonium and electric power.

LONG LOOK AT LUMBER—Weyerhaeuser Timber Co., Tacoma, arranges for study to be conducted by Stanford Research Institute, Palo Alto, Calif., to predict future demand for lumber, plywood, pulp and paper, wood fiber products and other forest products. Institute's senior economist, A. Kenneth Beggs, will direct project, to be completed in early 1954, and its results will be published by Weyerhaeuser.

STATE APPROVES MERGER — State Public Service Commission approves proposed merger of Puget Sound Power & Light Co. and Washington Water Power Co. Plan still requires approval of Federal Power Commission, Securities and Exchange Commission, and stockholders of both companies. Consolidation would join state's two largest private utilities.

NORTHWEST TRIES AGAIN—Northwest Natural Gas Co. resubmits to Alberta government an application for permission to export natural gas to Washington and Western Idaho. Previous application was refused by province. Northwest is one of three companies proposing to supply natural gas to Pacific Northwest in a hearing before Federal Power Commission.

RALSTON PLANT — Ralston-Purina Co. opens new $500,000 plant in Spokane built by Central Construction Co. Facilities consist of 60,000-bushel storage elevator, a 100 x 280-ft. warehouse, and machinery for feed-production. Output of plant is about 5,000 tons of feed a month.

BUY INDUSTRIAL LAND — Great Northern Railroad acquires a total of 126 acres of potential industrial sites in outlying area east of Spokane. Land will be developed in future as industrial growth of city warrants, company states.

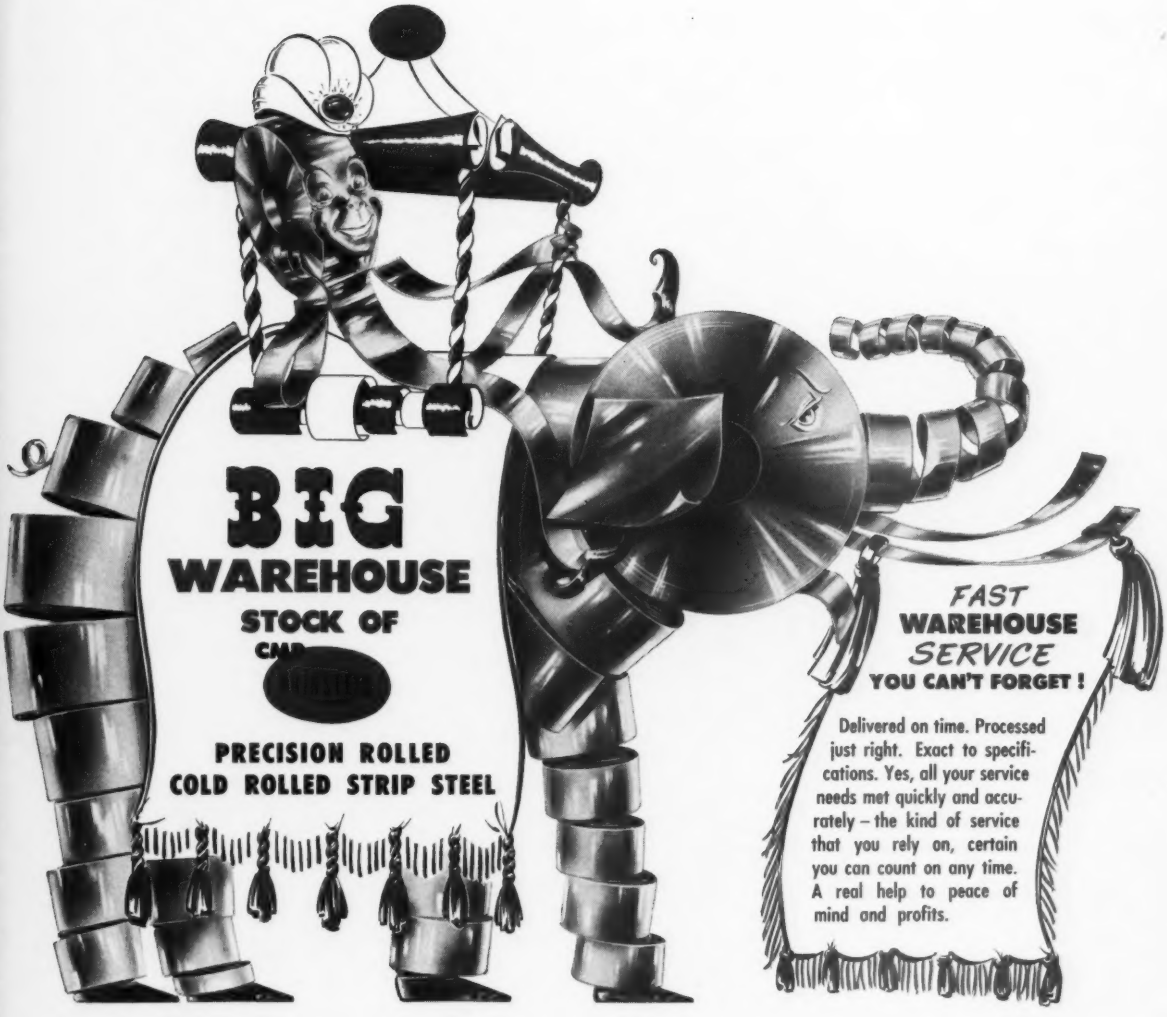
BEET SUGAR PLANT — Utah-Idaho Sugar Co. opens new $7,000,000 refinery at Moses Lake, in Columbia Basin.

HILLYARD REFINERY CLOSES—Phillips Petroleum Co. refinery at Hillyard closes, with imminent completion of petroleum pipeline to Spokane. Pipeline, constructed by Salt Lake Pipe Line Co., will ship petroleum products from three refineries in Salt Lake City area, among them the Phillips refinery at Woods Cross, Utah. Wholly-owned subsidiary of Phillips, Petroleum Terminal Co., is scheduled to set up facilities near terminus of pipeline and may use some of existing refinery installation.

HARDBOARD PLANT — Washington Hardboard plant at South Bend begins production of fiber from sawmill waste, as front part of plant is completed, and is scheduled to start test production of hardboard about January 1. Major piece of equipment, a 150-ton press built in West Germany, is being assembled and installed at present.

BOEING EXPANDS—Boeing Airplane Co. buys 12.3 acres north of its Plant No. 2, Seattle, for expanded production and storage facilities. New property adjoins 21-acre site of Air Force facilities, including $6,500,000 warehouse built by government and to be leased by Boeing.

SOUTH ATLANTIC PLANT — Aluminum Tubing Co., new Spokane corporation, is selecting a site for construction of an Eastern plant, to be located somewhere between Jacksonville, Fla., and Wilmington, N. C.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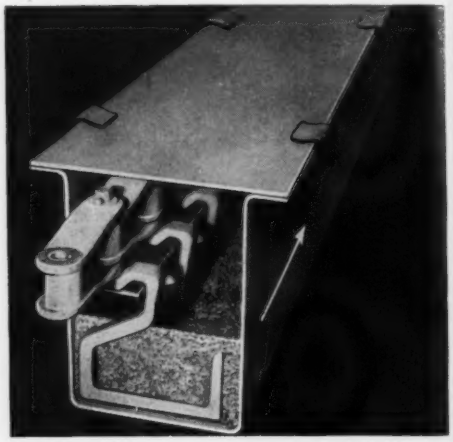

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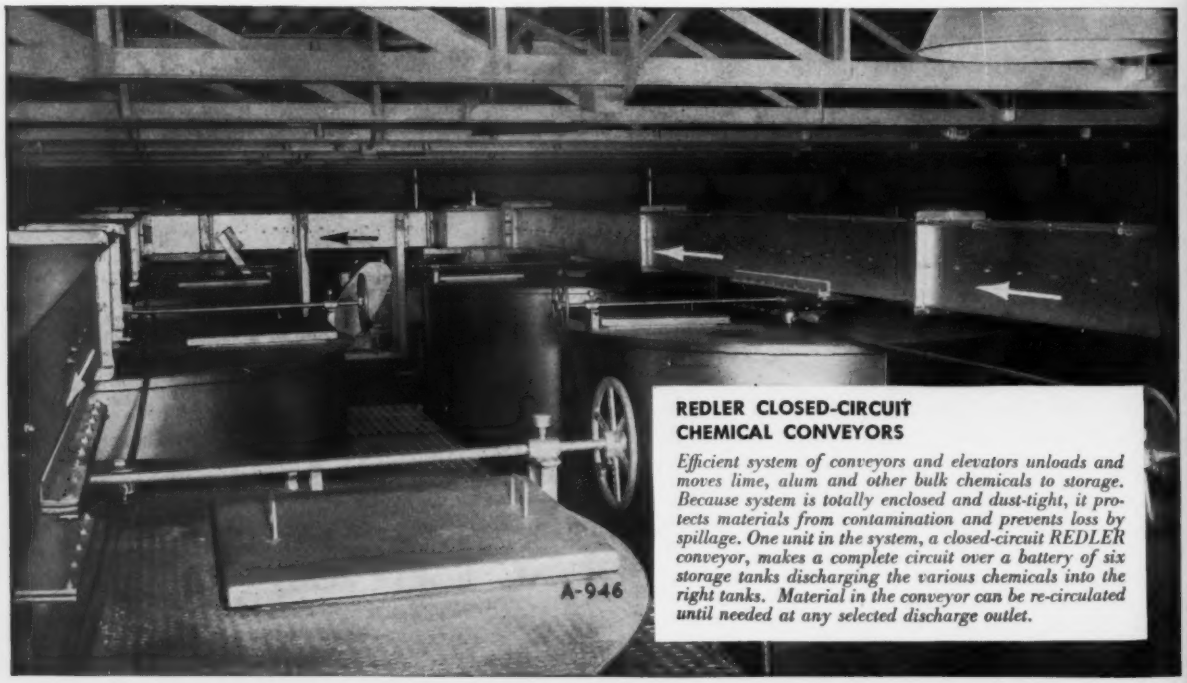

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